Medical Library

JAN 26 1943

BRITISH MEDICAL JOURNAL

JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY NOVEMBER 14 1942

TABLE OF CONTENTS

The Health of the Doctor A. HOPE GOSSE, M.D. 567

Clinical Significance of the Rh Factor—II
K. E. BOORMAN, B. E. DODD, B.SC., and P. L. MOLLISON, M.B. 569

Proportions of Antigen and Antibody in Tests for Rh Antibodies
G. L. TAYLOR, M.D., R. R. RACE, M.R.C.S., AILEEN PRIOR, M.SC., and ELIZABETH IKIN, B.SC. 572

Physical Treatment of Acute War Neuroses WILLIAM SARGANT, M.B. 574

Night Vision in the Army B. W. RYCROFT, F.R.C.S. 576

Four Cases of Bagassosis J. A. GILLISON, M.B., and F. TAYLOR, M.B. 577

Food Poisoning—I Sir WILLIAM SAVAGE, M.D. 584

MEDICAL MEMORANDA

Unusual Skin Sensitivity. ALLAN BIGHAM, M.D. 578

GENERAL ARTICLES AND NEWS

THE SERVICE ETHER VAPOUR APPARATUS 579
MEDICINE 100 YEARS AGO 596
THE SERVICES 594
UNIVERSITIES AND COLLEGES 593
MEDICAL NEWS 594

REVIEWS

Diseases of Metabolism 578
Pictorial Aids to Anatomy 578
Dental Surgery and Pathology 579
War Nurseries 579

LETTERS AND ANSWERS

Aspirin for Asthma—Income Tax—Hypnosis—Gastritis in Children and Priority Eggs—First-aid Treatment of Fractured Spine 596

OBITUARY

R. E. Moyes, M.D. 592
Hedley Wright, M.D. 592
W. F. Skinner, M.R.C.S. 592
H. G. Harris, M.D. 593
Frank Robinson, M.D., D.P.H. 593
D. Y. Richardson, M.R.C.S. 593

Epidemiology Section 595

LEADING ARTICLES

Rh Factor and Iso-immunization 580
Planning and the M.O.H. 580
Population Problems 581

ANNOTATIONS

How Much Vitamin D? 582
Juvenile Delinquency To-day 582
Synthesis of Ascorbic Acid by Animal Tissues 583
Night Vision 583

REPORTS OF SOCIETIES

ROYAL SOCIETY OF MEDICINE:
Future Status of Physical Medicine 586
Nutritional Anaemia in Children and Women 586

CORRESPONDENCE

Prevention of Small-pox. ARTHUR HOWARD, M.R.C.S. 587
Vitamins and Capacity for Work. H. W. HILLS, M.D. 587

SUPPLEMENT

RECRUITMENT OF DOCTORS FROM NORTHERN IRELAND 59
PATIENTS ATTENDED UNDER E.M.S. 59
FITNESS FOR FIRE-WATCHING 59
LAID-UP CARS 59
CORRESPONDENCE 59
ASSOCIATION INTELLIGENCE 60
H.M. FORCES APPOINTMENTS 60

CORRESPONDENCE—*Contd.*

What is "Sterile Blood"? FREDERICK PORTER, M.B. 587
Crush Injury and Anoxia. J. A. BARCLAY, M.B. 588
Tuberculin Skin Tests in "Influenzal Pneumonia." E. MONTUSCHI, M.D. 588
Treatment by Hypnosis. J. E. MIDDLEMISS, M.R.C.S. 588
Tonsillectomy: Guillotine or Dissection? NORMAN PATTERSON, F.R.C.S.; JOHN ROBERTS, F.R.C.S. 589
Rehabilitation Centres. HAROLD BALME, F.R.C.S. 589
Breast-feeding. T. H. E. TAYLOR-JONES, M.R.C.S.; MARGARET I. MCGILL, M.B.; C. R. NUNAN, M.B. 590
"Constipation" in Breast-fed Babies. W. C. W. NIXON, F.R.C.S. 590
Sedimentation Rate and Sedimentin Index. B. L. DELLA VIDA, M.D.; P. W. EDWARDS, M.B., A. CLARK PENMAN, M.B., and L. J. CUTBILL 590
Splenectomy in Purpura Haemorrhagica. P. KAZNELSON, M.D. 591
Future of the Profession. H. E. COLLIER, M.D. 591
Safe Milk. WILLIAM PICTON, B.M. 591
Cost of Treatment for Tuberculosis. F. D. G. THOMAS, M.B. 592

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.

No. 4271, WEEKLY, PRICE 1/6

Copyright

REGISTERED AS A NEWSPAPER

'S.V.C.'
in leucorrhoea

The treatment of leucorrhoea of trichomonal origin, formerly a most intractable condition, is now greatly simplified by the use of S.V.C. brand acetarsol vaginal compound.

THE PRODUCT IS AVAILABLE IN TWO FORMS; TABLETS FOR INSERTION, AND POWDER FOR INSUFFLATION INTO THE VAGINA

★ 'S.V.C.' IS AVAILABLE IN
Containers of 25 tablets - - - 4s. 0d.
POWDER: Containers of 6 x 3 gms. - 8s. 6d.
(Less professional discount and plus purchase tax.)

also available in—
Containers of 12 tablets Containers of 100 tablets Containers of 500 tablets

OUR MEDICAL DEPARTMENT WILL BE GLAD TO SUPPLY YOU WITH FURTHER INFORMATION

★ TRADE MARK

PHARMACEUTICAL SPECIALITIES M&B (MAY & BAKER) LIMITED DAGENHAM

5011

SEASONABLE PREPARATIONS

ELIXIR RIBES NIG. CO.
(DUNCAN)

A combination of Codeina Ipecac., Menthol, etc., flavoured with Syrup Ribes Nig., which is prepared from the finest fresh fruit.

ELIXIR TERPO-CODEIN. CO.
(DUNCAN)

A pleasantly flavoured elixir, containing Codeina Phosphate and Terpin Hydrate in a suitable base.

Duncan

THESE ELIXIRS ARE MOST SUITABLE FOR THE TREATMENT OF COUGHS IN CASES OF PHTHISIS, CHRONIC BRONCHITIS, CATARRH, ETC.

PRICES ON APPLICATION

DUNCAN, FLOCKHART & CO.
EDINBURGH and LONDON

104, Holyrood Road, 8 155, Farringdon Road, E.C.1

METABOLIC RATE

Methods of Stimulating

PERHAPS one of the most common of all the conditions that a general practitioner is called upon to deal with is the condition of depressed metabolism.

Drastic methods of increasing the metabolic rate — by intravenous injection of thyroxin, or the administration by mouth of compounds of the nitro-phenol group — are, of course, possible. Such methods, however, are usually contra-indicated, and the practitioner relies on the prescription of such foods as meat extracts, home-made broths, etc.

It is a matter of some importance, therefore, to know that *one* of the accepted meat preparations is outstandingly effective in raising the metabolic rate. It is Brand's Essence. The heat output increases sharply immediately Brand's Essence is taken. It reaches a peak after half an hour and is still appreciable six hours later.

Whenever there is a need to raise the metabolic rate, Brand's Essence may, therefore, be prescribed with confidence. It is of special convenience in cases where the patient cannot tolerate sufficient protein.

A further advantage of Brand's Essence is that patients find it palatable even when all other foods are distasteful. Brand's has the effect of instantly stimulating the appetite.

Brand's Essence is still sold at the pre-war price.

BRAND'S ESSENCE

BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 14 1942

THE HEALTH OF THE DOCTOR*

BY

A. HOPE GOSSE, M.D., F.R.C.P.

Physician to St. Mary's Hospital and the Brompton Hospital

I chose for this address the subject of mortality and morbidity among medical men because I believe I have had unique experience of this subject, and have access to innumerable records in connexion with it. I shall unfold to you the causes of death, as well as the amount of ill-health and its various causes, among medical men who start with good average health, after medical examination, at the average age of 30 and are followed up until 60 or 65 years old. I shall then deal with the claim that coronary thrombosis is the "doctor's disease." The family history of those who develop coronary thrombosis and pulmonary tuberculosis will be contrasted with that of the healthiest members of the profession who are still in active practice at the age of 65.

It is important to remember that this experience applies to those who enjoy good health at the average age of 30 and have a good prognosis for health and life. As it would have been an insuperable task for me, even if it were worth while, to analyse the records of all the years, 1938 was chosen for a detailed analysis as it was the last pre-war year and there was no epidemic.

In that year there were under observation 8,884 medical men drawn from all branches of the profession, including dental surgeons. Their ages ranged from 25 to 65 in the following age groups: 25 to 35, 2,411; 35 to 45, 3,604; 45 to 55, 1,799; 55 to 65, 1,070. The average age at which the men came under observation was just over 30 years, and they were not followed after 65 years of age. The ill-health of the doctor will be divided into those diseases which cause death, and those which cause disablement from following any part of his professional work for a period of at least 7 days, such disability being certified by a registered medical practitioner. Illness causing inability to work for any period shorter than 7 days was not observed, and is not included in this analysis. The source of my material is such that the investigation can be regarded as based on complete and reliable records. I have been unable to find any comparable figures (for total numbers, accuracy of records, and the number of years followed up) either for the medical or for any other profession or grade of worker.

Mortality Rate

I shall now deal with the mortality of doctors during their most strenuous working years from the ages of 25 to 65, based on the deaths in 1938 among the 8,884. Deaths occurred in all decades and in the following numbers:

Ages	Nos. Observed	Deaths	% Deaths
25–35	2,411	8	0·33
35–45	3,604	9	0·24
45–55	1,799	8	0·44
55–65	1,070	16	1·5

In 1938, however, the death rate of ages 25 to 35 was noted to be high, with 8 deaths, so the same decade for 1939 was analysed. It showed only 3 deaths out of approximately the same numbers of doctors, a percentage of 0.12—a fairer figure for the annual experience of that decade. With this corrected figure it will be noted that the annual death rate increases in each decade, as we would expect, but in the following ratio—0.12:0.24:0.44:1.5, or as 1:2:4:13. As, however, each man is exposed to the annual death rate for his decade for 10 years before he passes into the next decade his risk for each *decade* must be 10 times the annual risk, and these figures amount to 25; in other words, 1 in 4 doctors die before the age of 65, or it may be more happily stated that 3 out of 4 doctors survive till 65 years of age.

It is true that 41 deaths a year among 8,884 men for 40 years gives a death rate of only 18.4%; but this method of calculating does not take into account that the average age of the 8,884 in 1938 was 41½ years. This average age of 41½ is lower by 3½ years than the mean between 25 and 65 years of age, and the lower years have been shown to have a lower mortality.

What are the causes of early death among doctors? In addition to the year 1938, when there were 41 deaths, I took the year 1939 and up to May, 1940, so as to get 100 consecutive deaths among these 8,884 doctors, omitting those from enemy action. The causes of 89 deaths were obtained; the causes of 11 could not be determined, so I took the next 11 deaths to get a consecutive 100 in which death certificates were available.

Causes of 100 Consecutive Certified Deaths in 8,884 Doctors		*J. Amer. med. Ass. 100 Consecutive Death Notices at all Ages*
Cardiovascular degeneration	17	15 {8 cardiac, 7 arteriosclerosis}
Malignancy	15	5
Pneumonia (pleurisy)	12	1
Coronary thrombosis	10	9
Hemiplegia	9	–
Suicide and misadventure	7	–
Accidents	5	2
Pulm. tuberculosis	4	3
Rt. heart disease	3	–
Congen. aneurysm	2	–
Aortic aneurysm	1	–
Infections:		
Brain	2	–
Septicaemia	2	–
Enteric fever	2	–
Peritonitis	2	3
Bact. endocarditis	2	–
Ulcerative colitis	1	–
Prostate	1	–
Enemy action	1	–
Blood diseases	1	–
Perf. duod. ulcer	1	–
Cirrhosis of liver	–	1
Acute gastritis	–	1
Chr. nephritis	–	1
Bronchiectasis	–	1
Unstated	–	58
	100	100

Causes of Illness among Doctors

What are the causes of morbidity among doctors? Let me first repeat that no account is taken of illnesses of less than 7 days, but all illnesses in which the doctor was unable to do his work for 7 days or over are included. In the year 1938, 1,620 of the 8,884 doctors were ill for over a week,

* The Presidential address to the Medical Society of London.

in many instances for many weeks. Some of them had been ill for months or years; on the other hand, some were only beginning long illnesses. These 1,620 were certified by registered medical practitioners as suffering from the following disabilities:

Respiratory infections	351	Insanity	11
Influenza	276	Colitis	11
Accidents	100	Malignancy	11
I.C.T. skin	68	Pleurisy	10
Anxiety state	60	Auricular fibrillation	9
Fibrositis	55	Measles	9
Appendicitis	54	Scarlet fever	7
Infections of hand	51	Diphtheria	7
Special senses	49	Prostate	7
Peptic ulcer	45	Chicken-pox	6
C.N.S.	33	Ischio-rectal abscess	5
Degen. cardiovasc. dis.	29	Angina pectoris	5
Pyelitis and cystitis	27	Glandular fever	5
Pneumonia	21	Erysipelas	3
Pulm. tuberculosis	18	Gout	3
Renal disease	17	Whooping-cough	3
Gall-bladder	15	Diabetes	2
Jaundice	13	Hyperthyroidism	2
Mumps	12	V.D.H.	2
Asthma	12	Undulant fever	2
Coronary thrombosis	12	Thyroid disease	2
Rh. and osteo-arthritis	12	Typhoid	1
Acute rheumatism	11	Unclassified causes	156

These 1,620 doctors were totally incapacitated for 7,040 weeks in the first six months of their illness and 3,942 weeks in the second six months, a total of 10,982 weeks. In other words, 1,620 doctors out of 8,884 were ill and unfit for work for 10,982 weeks in 1938, an average illness rate of 47 days each, while 7,264 doctors did not have a week's illness; the average sickness for the 8,884 was therefore 8.6 days a year. To generalize, every doctor must expect to have an average of 8.6 days of illness every year from the age of 25 to 65.

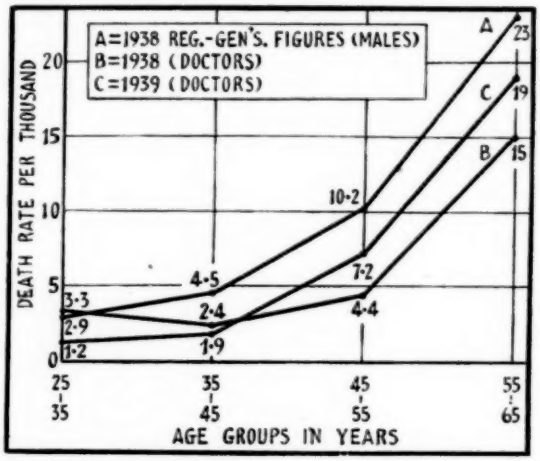
As a check on these figures and the conclusions drawn I investigated the amount of sickness in 100 consecutive doctors who reached the age of 65. They had been under observation for an average of 30¼ years, and had suffered 3,314 weeks' illness—that is, an average of 7.5 days every year from the age of 35 to 65. Those who reach the age of 65 might be acclaimed as slightly tougher than the whole group, which includes those who fall by the wayside and die on the journey, perhaps after a long illness. Seven out of the 100 doctors did not have a week's continuous illness during their working lives.

Coronary Thrombosis

The title of "the doctor's disease" has been given to coronary thrombosis. The reason for this may lie in the last published Decennial Report of the Registrar-General relating to the deaths in England and Wales for 1930, 1931, and 1932. The causes of death were tabulated under 86 groups of occupations, and the report shows that the deaths from angina pectoris or coronary disease among 25,000 physicians and surgeons amounted to 70. This was no less than 368% of the average of all occupations, and was commented on as follows: "Their angina pectoris ratio of 368 was much the highest amongst the 86 occupations, being 64% in excess of the ratio for the remaining occupations in Social Class I and 11½ times as great as that for agricultural labourers."

It must be assumed that deaths from coronary thrombosis were then usually certified as angina pectoris. It was at that time that a new conception of coronary thrombosis had been demonstrated to us by our colleagues in America, and this new and accepted conception was applied to the deaths of doctors before it permeated the certificates of all other social classes. It is to be expected that the Registrar-General's next Decennial Supplement will show a further increase for doctors and a far greater increase in all other classes of workers as this cause of death is substituted for myocardial degeneration. The Registrar-General on page 57 referred to "the still more rapid increase in certification of deaths due to angina pectoris." A fairer comparison may be to take the total of deaths due to "heart diseases," which shows that physicians and surgeons had a mortality 138% of the average of the community. This figure is still high, but it does not bear the enormous significance of over three and a half times the death rate from angina pectoris of the general population. The Registrar-General seems to have taken the same view, for on page 60 the following much-less-quoted statement is found: "It would appear that degenerative disease in the heart affects all classes of males to much the same extent, but whereas amongst men whose social conditions are most favourable it tends to express itself in forms diagnosed as angina pectoris or coronary disease, at the other end of the scale it tends to take forms described on death certificates as myocardial degeneration."

In the *Proceedings of the Staff Meetings of the Mayo Clinic* for Nov. 5, 1941, p. 714, is an article by F. A. Willius entitled "A Talk on Cardiac Disease among Physicians." He opens his paper thus: "Why do so many physicians die from heart disease?" and goes on, "The cardiac death rate among physicians to-day is appalling. Anyone doubting the authenticity of this statement need only peruse the obituary list of any current number of the *Journal of the American Medical Association* to find death ascribed to heart disease in 30 to 60% of cases in which the cause of death is stated. In the majority of instances coronary disease is the cause of death, and coronary thrombosis is the ranking killer." A fallacy is avoided by the words "in which the cause of death is stated." It is quite possible that when only 42 out of 100 death notices mention the cause of death these may include all the coronary thrombosis deaths. It would appear from my list that 27 out of 100 deaths among doctors before the age of 65 are due to cardiovascular degenerative causes and 9 to cerebral vascular degenerative causes. Even then their death rate is lower than for the male population of England for the same year.



Where is the evidence that any other profession or trade has a lower rate than 27 cardiovascular deaths in 100 deaths before age 65? I cannot find it. I do not think it exists. I do not believe coronary thrombosis is "the doctor's disease." The true position in Great Britain is that 1 doctor in 4 dies before he reaches the age of 65, and 1/10 of 1 in 4, or 1 in 40, dies from coronary thrombosis, and less than 1 in 10 up to 65 years of age dies from all cardiovascular and cerebrovascular degenerations, including coronary thrombosis.

It then appeared to me of interest to analyse the family histories, as known at the age at which a man comes under observation, in those who suffered from coronary thrombosis or pulmonary tuberculosis, and as a control those who reached the age of 65 and were in work at that age. They are set out in the accompanying table.

Family Histories

	Of 37 who died of or developed Coronary Thrombosis	Control Group of 37 at Work at 65	Of 37 who suffered from Pulmonary Tuberculosis
Parent died of vascular hemiplegia	6	7	3
" " " heart disease	5	5	5
" " " angina	2	1	1
" " " pulm. tuberculosis	1	0	1
Brother or sister " " " "	4	3	3
Relative " " " "	2	0	0
Mean blood pressures: Systolic	133	130	130
Diastolic	80	86	81
Average weight	12 st. 12 lb.	11 st. 5 lb.	11 st. 10 lb.

From these small figures it might be misleading to be at all dogmatic; but in general it may be said that there is no evidence at all here that men who develop coronary thrombosis have had a parentage with a bad family history of early cardio-

vascular disease. The healthiest doctors at the age of 65 have had a similar family history of cardiovascular disease, and much the same may be said of those who develop pulmonary tuberculosis; my inference is that the same experience would be found in the same number of doctors suffering from other diseases. Also, it can be generally stated that the medical men who develop pulmonary tuberculosis between the ages of 30 and 65 have no worse tuberculous family history than the healthiest doctors, nor indeed than those who develop coronary thrombosis. I believe the converse is true: that a family history of tuberculosis is negligible after the age of 30, and even before that age.

Onset of Coronary Thrombosis.—The records were then searched to find at what ages coronary thrombosis occurred, how many died of this illness, how many survived and were unfit to work again, and how long those worked who completed their convalescence.

Ages at Onset			Deaths	Unfit for Work	Returned to Work
35–45	45–55	55–65			
7	19	11	11	8 years, 1 5 ,, 3 4 ,, 1 1 ,, 3	18* Working : 4 years, 2 3 ,, 6 2 ,, 2 1 ,, 4 <1 ,, 2 Reached 65 2
Approx. No. of Living in Each Group in 100s :					
36	18	11			

* Average duration of unfitness for any work was 18 weeks.

From this it can be said that out of 37 who develop coronary thrombosis 11, or approximately 1/3, die, 8 become ambulatory but unfit for work, whereas 18, or half of them, are working after a year or for a few years. Liability to coronary thrombosis steadily rises with successive years, as one would expect, but only to the age of 45, when a plateau is reached which remains flat to the age of 65.

Onset of Tuberculosis.—At what ages do the 37 who suffered from tuberculosis develop their disease?

Ages at Onset				Deaths	Unfit for Work	Returned to Work
25–35	35–45	45–55	55–65			
16	12	8	1	6	10 (up to 9 years)	21* Working : 23 years, 1 12 ,, 1 7 ,, 1 5 ,, 3 4 ,, 5 3 ,, 5 2 ,, 2 <2 ,, 3
Approx. No. of Living in Each Group in 100s :						
14	36	19	11			

* Average duration of unfitness for any work was 65 weeks.

Summary

1. The causes of death among doctors before the age of 65 have been stated.

2. The causes and incidence of ill-health among doctors have been tabulated.

3. The title of "the doctor's disease," given to coronary disease, is challenged.

4. It was found that the parental history as regards cardiovascular degeneration was the same for 37 doctors who developed coronary thrombosis as for a control group of 37 doctors who were still working at the age of 65, both these groups having been passed fit at the age of 30.

5. It was also found that the parental history as regards pulmonary tuberculosis was the same for 37 doctors who developed pulmonary tuberculosis as for the control group of 37 doctors who were still working at the age of 65, both these groups having been passed fit at the age of 30.

During the Balkan campaign according to German experience (Weiler: *Dtsch. Militärartz.*, 1941, **11**) the principal diseases occurring were dysentery and influenza. Acute influenza was often difficult to distinguish from typhoid. The percentage of cases of bronchopneumonia (41) was high. Half of the cases were treated with sulphonamides and the other half with "novalgin" and quinine. The results were the same in both groups. The author believes that the best results were obtained by intravenous injection of quinine-calcium.

THE CLINICAL SIGNIFICANCE OF THE Rh FACTOR

BY

K. E. BOORMAN B. E. DODD, B.Sc.

AND

P. L. MOLLISON, M.B., M.R.C.P.

(*Concluded from p.* 538)

Haemolytic Transfusion Reactions Due to Rh Antibodies

As first pointed out by Wiener and Peters, the repeated transfusion of Rh-positive blood to an Rh-negative individual may be followed by a haemolytic reaction due to the production of Rh antibodies as a response to the first or subsequent transfusions. The following case is probably of the mildest type of this reaction.

A Mild Type of Reaction

Case 1.—A man aged 25 had had symptoms of ulcerative colitis for 8 years. In November, 1940, he had a relapse and received two transfusions totalling 2,500 c.cm. of citrated stored blood of group O. These transfusions were followed by clinical improvement, and the patient remained well for many months. He was readmitted to hospital in April, 1942, with a return of symptoms, however, and in view of the success of the previous treatment it was decided to give him a further transfusion. He was found to belong to group O Rh-negative. His serum was tested against a series of group O bloods and found to give no reactions at all at 37° C. or at any other temperature. It was therefore considered safe to proceed with the transfusion of blood from two of these donors. For purposes of record these bloods were also tested with anti-Rh sera and found to be Rh-positive.

1,000 c.cm. of citrated blood from these two donors was given slowly over a period of 5 hours. Following the transfusion the patient had a slight headache and a rise of temperature to 100° F. but no other symptoms, and when seen on the next day expressed himself as feeling better for the transfusion. A venous sample was obtained 48 hours after the transfusion for comparison with the pre-transfusion sample. It was found that only insignificant changes in haematocrit and haemoglobin values had occurred; at the same time it was noted that the serum of the later sample was distinctly yellow, in contrast with that of the pre-transfusion sample, which was pale. A test was made to see whether the Rh-positive blood was surviving in the recipient's circulation by testing a suspension of blood taken from him with a potent anti-Rh serum. Many moderate-sized clumps were found in the suspension, thus indicating the survival of a substantial part of the transfused blood, since a control test with the recipient's blood before transfusion showed no trace of agglutination.

A further sample was obtained upon the fifth day, and it was noted that the serum was even more icteric; a quantitative van den Bergh test showed that it contained 1.5 mg. per 100 c.cm. Examination of the serum with a series of group O bloods revealed the presence of an Rh antibody. A survival test showed that only a small amount of Rh-positive blood was now present in the circulation. On the seventh day after transfusion there was no trace of the donor blood in the recipient's circulation, and the Rh antibody had risen further in titre.

Throughout the period of observation the patient continued to improve slowly, and he left hospital on the eighth day. Blood urea estimations were carried out upon the fifth and seventh days after transfusion; strictly normal values were found.

Reactions in Recently Delivered Women

The frequency with which intra-group haemolytic transfusion reactions occur in women whose infants are affected with erythroblastosis foetalis has been stressed by Levine, Katzin, and Burnham, and corroborated by Wiener. In the present series of investigations 4 such cases have been encountered. Two illustrative cases are here quoted to demonstrate the variation in severity of the reactions.

Case 2.—A woman aged 25: two previous pregnancies. The first was normal throughout, resulting in the birth of a normal baby. The second resulted in a baby which developed jaundice during the first week of life, but subsequently improved without relevant treatment. After delivery the mother was found

to have high blood pressure, oedema, and albuminuria. During the third pregnancy she remained well until about the eighth month, when swelling of the ankles, albuminuria, and hypertension developed. At this time the uterus became suddenly more bulky and hydramnios was diagnosed. On June 9, 1942, she was delivered of twins, the first of whom died after 2 to 3 hours and the second after 8 hours. Both infants had gross ascites and all the other features of hydrops foetalis. On the fifth day after delivery it was decided to give the mother a transfusion because of her anaemia. It was found that the patient's group was O Rh-negative, and that her serum contained an Rh antibody. (The twins were group A Rh-positive.)

Two group O and supposedly Rh-negative donors were selected by tests made with the patient's serum and with another human serum containing only moderately active Rh antibodies. A concentrated cell suspension was prepared from the blood of these two donors and transfusion was begun at a drip rate. By the end of an hour approximately 250 c.cm. had been given without any untoward reaction. Shortly afterwards, however, the patient started to complain of violent lumbar pain, difficulty in breathing, and generalized discomfort. The transfusion was stopped, approximately 300 c.cm. having been given, but she started to shiver and had a violent rigor followed by a rise in temperature. A venous sample was obtained 3 hours after the beginning of the transfusion, and it was found that the serum had become intensely icteric. Examination of the recipient's blood confirmed that her cells were group O Rh-negative, type MN, and that her serum contained an Rh antibody. The blood of both the donors was now retested with a sample of human serum containing very potent Rh antibodies, and it was discovered that one of the donors was Rh-positive (and the other Rh-negative). Both belonged to type N. By means of the differential agglutination technique it was possible to show that by the day after the transfusion the recipient's blood stream contained only half the expected number of type N cells (the calculation being made from the known amount and known red cell count of the blood transfused). Moreover, there was no trace of reaction with the potent Rh antiserum. It thus was clear that the blood of the Rh-positive donor had been eliminated, whereas that of the Rh-negative donor had survived. The fate of the latter cells was investigated by tests made during the following few weeks; it was found that they were only slowly eliminated.

Since the post-transfusion sample contained no free haemoglobin in the serum it was not surprising that the patient's urine was free from this pigment. The subsequent course of the case was entirely favourable.

Case 3.—A woman aged 36: four previous pregnancies. The first was terminated by craniotomy of the foetus because of disproportion. The second child was born prematurely after induction of labour a week or so before term. The child was very jaundiced, and died on the second day. The third pregnancy terminated in the birth of a stillborn child at 8 months. The fourth pregnancy resulted in the birth of a macerated foetus at 7 months. The fifth pregnancy was terminated by Caesarean section on Aug. 26, 1942. A living female child was delivered, but slight jaundice was apparent. At the end of 24 hours it was more jaundiced, and on the 28th a blood count showed R.B.C. 1.89 millions per c.mm., Hb 52%, and normoblasts approximately 16,000 per cmm. The infant died on Aug. 29.

Following the Caesarean section the mother became rather collapsed, and 20 oz. of citrated blood of group O were given. An hour after the end of transfusion she had a rigor, and 6 hours later complained of severe abdominal pain and backache and the respirations rose to 56 a minute. On the day after transfusion she was slightly jaundiced, and 29 oz. of dark brown urine were obtained by catheter. During the next 4 days only 12 oz. of urine altogether were passed, and the patient died suddenly on Aug. 31. Microscopical examination of the kidneys showed the typical features of necrosis of the tubules and the presence of masses of pigment in the tubular spaces.

Investigations carried out on Aug. 30 showed that the patient belonged to group A and was Rh-negative; her serum contained an Rh antibody. Her husband's group was O Rh-positive. A test was made by the "inagglutinable count" technique to see whether any of the group O blood given 4 days previously was surviving. It was found that this blood had been completely eliminated from the recipient's circulation. It was thus clear that the blood had been incompatible, and on examination it was found, as expected, that the donor was group O Rh-positive.

Transfusion of the Affected Infant

Levine, Burnham, Katzin, and Vogel have already reported that after the transfusion of Rh-negative blood the infant maintains higher values of R.B.C. count and Hb concentration than after the transfusion of Rh-positive blood. Nevertheless, from observations of changes in R.B.C. counts and Hb concentration it is difficult to reach decisive conclusions unless considerable and consistent differences are found. A more reliable method of demonstrating the different survival of Rh-negative and Rh-positive blood in the circulation of infants affected with erythroblastosis is to use the method of differential agglutination. By an elaboration of this method it is possible after transfusing a mixture of Rh-negative and Rh-positive bloods to estimate the survival of the two types separately. The result of these experiments will be reported later (Mollison), but the following preliminary conclusions are set out, since they appear to be important from the point of view of treatment.

The rate of destruction of Rh-positive blood in the circulation of affected infants varies enormously from one case to the next. In some cases only slight differences have been found between the survival of Rh-positive and Rh-negative blood. More often, however, very great differences have been observed. The fact that there is a group in which the period of survival of Rh-positive blood is so much shorter than that of Rh-negative blood makes it very desirable to use Rh-negative donors as a routine for transfusion in cases of erythroblastosis foetalis.

Discussion

Iso-immunization in Pregnancy

Dienst (1905) first noted that when the mother's serum contained an agglutinin that was incompatible with the infant's erythrocytes the potency of her iso-agglutinins increased considerably during the fourth to eighth days after delivery. Jonsson (1936) made a study of the sera of women 2 to 3 months after delivery and found evidence of specific stimulation in some cases of "hetero-specific pregnancy": that is to say, when the mother belonged to group O and the infant to group A, for example, the mother's anti-A agglutinins were found to be stimulated. Jonsson did not titrate the sera, but simply used the presence of iso-haemolysins as evidence of an immune response. For this reason probably, he found evidence of specific stimulation in only a certain proportion of cases. As mentioned above, Levine and Stetson first suggested that the presence of atypical agglutinins in the serum of a recently delivered woman might be the result of immunization to an antigen in the foetus; and Levine *et al.* soon afterwards described many cases in which the atypical agglutinin had been found to be anti-Rh, and thus developed their theory of the aetiology of erythroblastosis foetalis, as outlined above. Naturally some explanation is needed for the fact that the presence of immune anti-A agglutinins in the serum of a mother carrying a baby of group A usually leads to no obvious abnormality in the baby, whereas the presence of immune anti-Rh agglutinins is so often associated with erythroblastosis of the (Rh-positive) infant. Wiener has suggested that this is because the Rh factor is found only in the erythrocytes, whereas the A and B substances are present in all the body tissues and secretions (in the majority of individuals whose erythrocytes contain the A or B factor), and thus protect the erythrocytes from damage. Levine *et al.* have suggested that in those individuals of group A, B, or AB whose body fluids do not contain the group-specific substances (the non-secretors of Schiff) the presence of immune anti-A or anti-B agglutinins in the mother's serum may lead to erythroblastosis. It may be pointed out that in any case in which the immunizing factor, be it Rh or A or B, is present only in erythrocytes, it is necessary to postulate the actual entry of foetal erythrocytes into the maternal circulation for immunization to occur.

Wiener (1942) has suggested that other atypical agglutinins besides anti-Rh may occasionally be the cause of erythroblastosis. The presence of atypical agglutinins, different from anti-Rh, in the serum of a recently delivered woman has been reported by Levine and Polayes (1941), among others.

In the series of cases described here in which the infant had definite erythroblastosis, an immune agglutinin incompatible with the infant's erythrocytes was found in the mother's serum in every case. In 44 out of 48 cases this agglutinin was anti-Rh, although in some of them immune anti-A or anti-B agglutinins were also found. In the remaining 4 only immune

anti-A or anti-B agglutinins were observed. Moreover, in these 4 the presence of other atypical agglutinins was unlikely, because the mother's serum did not agglutinate any of a series of 10 to 20 group O bloods when tested at different temperatures. This observation supports the idea that anti-A or anti-B agglutinins may occasionally cause the destruction of foetal erythrocytes of group A or B and thus be the chief aetiological factor in some cases of erythroblastosis foetalis.

The failure to demonstrate Rh agglutinins in the infant's serum in the majority of cases is not surprising, since these antibodies are not usually present in high titre in the mother's serum and since they will be expected to be absorbed on to the infant's (Rh-positive) cells. Nevertheless, as we have said, they could be readily demonstrated in one case in which the sera of identical twins who lived for only a few hours after birth were examined post mortem.

It will be noted that in the present series Rh antibodies have been found far more often than in the series described by Levine and his co-workers. The technique used by the latter authors consisted in incubation of the mixture of cells and serum (30 to 60 minutes at 37° C.), followed by centrifugation at low speed (500 r.p.m.) for one minute and by gentle shaking to resuspend the sediment. The tubes were then examined macroscopically for evidence of agglutination, and apparent negatives were examined microscopically. We have found that this technique is not so sensitive as that of simply allowing the mixtures to stand in the incubator for 2 hours, followed by examination of the pattern of the sediment and by a withdrawal of a portion of the sediment for microscopical examination, the latter operation being carried out with delicacy. Even the gentle shaking of the tubes advised by Levine *et al.* may, in our experience, completely abolish a weak reaction. It is of course necessary to carry out control tests with Rh-negative cells if weak reactions are to be accepted as evidence of the presence of an Rh antibody.

Selection of Blood Donors for those who have become Immunized to the Rh Factor

In the 3 cases described in which haemolytic reactions followed the transfusion of Rh-positive blood to an Rh-negative individual who had previously been immunized to the Rh factor, it will be noted that the essential feature is a rapid elimination of the donor blood from the recipient's circulation. This finding is in striking contrast to the survival time of compatible blood, which has been shown to be consistently 80 to 120 days (Wiener, 1934; Mollison and Young, 1942). From the 3 cases quoted above the impression may be gained that serious sequelae are the exception and not the rule following the transfusion of Rh-positive blood to a person whose serum contains an Rh antibody. However, it should be mentioned that in the 2 cases of which details have not been quoted the transfusion was followed by oliguria with a steadily rising blood urea. In these cases the patient, after being critically ill, at the end of 7 to 10 days after transfusion gradually started passing normal quantities of urine again, and recovered. Even in Case 1, in which there were apparently no untoward consequences at all, it is clear that the transfusion was of no benefit to the patient.

In Case 2 it was demonstrated that Rh-negative blood survived normally in the recipient's circulation after transfusion, and Wiener (1941) has published many such cases in which he has been able to demonstrate that Rh-negative blood survives normally.

For the transfusion of any recently delivered woman, and particularly in any case in which there is a suspicion that the individual has become immunized to the Rh factor, it is clearly very desirable to have available a panel of Rh-negative donors. At present large stocks of potent Rh test sera are not available, but if the recipient's serum is found to be incompatible with the donor's cells it should be possible to test the serum against a number of other individuals and to find a compatible donor.

It is probable that a modified compatibility test, as described above, will serve to detect the majority of cases in which Rh agglutinins are present. Clearly it will be of further help to know whether the prospective recipient is Rh-negative or not. It is strongly recommended that this modified compatibility test be used as a routine before the transfusion of recently delivered women is undertaken. Where there are no facilities for carrying out this test two compromise procedures are available:

(*a*) In any case in which there is reason to suspect that the infant has erythroblastosis, or if there is a suspicion that any previous infant has had erythroblastosis, transfusion of the mother should be avoided if possible. Obstetric shock, post-partum haemorrhage, etc., should be treated by serum or plasma transfusion. Cases in which erythroblastosis is suspected should include all cases in which the infant is stillborn without obvious cause, and all cases in which the infant is born with oedema, jaundice, or obvious anaemia. (*b*) Rh-negative donors should be used as a routine either for the group mentioned in procedure *a* above or, better still, for the transfusion of all recently delivered women. This latter procedure has already been adopted by Levine *et al.* (1941) and Wiener (1941), but it must be pointed out that its immediate application on a large scale would present very great difficulties.

In discussing the choice of a donor for the affected infant the question of the suitability of the mother or father naturally arises, since they may be the only donors readily available. In this, as in all transfusions, the most important factor is the compatibility of the donor's erythrocytes with the recipient's serum. Compatibility in this case, however, has to be defined as "enjoying normal survival in the recipient's circulation," because it is not usually possible to demonstrate Rh agglutinins in the infant's serum, even in cases in which rapid elimination of Rh-positive blood is observed. From the point of view of the donor's erythrocytes the mother is suitable and the father unsuitable.

There is another factor to take into account, however—the compatibility of the donor's serum with the recipient's erythrocytes. This factor is ignored by some clinicians who regularly use, for instance, individuals of group O for transfusion to individuals of any group. Nevertheless, as demonstrated recently by Aubert, Boorman, Dodd, and Loutit (1942), the transfusion of serum containing potent incompatible agglutinins can result in the destruction of some of the recipient's erythrocytes. In infants who have developed a haemolytic anaemia as the result of the passage of Rh agglutinins through the placenta it is obviously undesirable to transfuse further amounts, and for this reason the transfusion of blood from the mother is to be deprecated.

Clearly, the ideal donor is an Rh-negative individual whose serum does not contain an Rh antibody and whose blood is also of the same group as the infant. However, when the infant is of group A and the mother is group O Rh-positive, and the destruction of the infant's erythrocytes is due to the mother's anti-A agglutinin, as we have supposed above, the most suitable blood for transfusion will be group O the serum of which contains low-titre agglutinins, since, by analogy, group A blood will probably be destroyed more quickly than group O blood in the infant's circulation.

To sum up, the most suitable donors for the majority of erythroblastotic infants requiring transfusion are group O Rh-negative persons whose serum contains only low-titre agglutinins. Since they will also be the most suitable donors for transfusion for the majority of recently delivered women, it seems very desirable for every donor organization to collect a group of such individuals.

Incidence of Affected Infants in Different Families

When a case of erythroblastosis has occurred in a family some help may be given in the prognosis regarding future children by testing the blood of father, mother, and any available siblings. If, for instance, the mother is Rh-negative and the father Rh-positive and any of the children are Rh-negative, it is clear that the father's genotype is Rhrh, and therefore there is an even chance that future children will be Rh-negative and presumably not affected with erythroblastosis. If, on the other hand, all the children are Rh-positive, it will be more likely that future children will be affected.

Summary and Conclusions

In every case of erythroblastosis examined the serum of the mother has been found to contain an immune agglutinin which is incompatible with the infant's erythrocytes. In 44

out of 48 cases the agglutinin was anti-Rh. In the remaining 4 cases it was either anti-A or anti-B. Because of this latter finding it is considered that the anti-A and the anti-B agglutinins are capable of causing destruction of the infant's erythrocytes in a certain number of cases and thus, in some instances, of being the main causative factor of the erythroblastosis. The finding of weak Rh antibodies in the sera of the mothers of some babies with "physiological jaundice" supports the idea that there is no clear-cut distinction, from the clinical point of view, between mild and severe jaundice of the newborn.

At the present time, if serological tests are used as an aid in the diagnosis of doubtful cases of erythroblastosis, compatibility of the mother's serum with the infant's erythrocytes may be regarded as a strong point against the diagnosis, provided that the mother's serum is examined by a sensitive technique between 7 and 21 days after delivery. On the other hand, if the mother's erythrocytes are shown to be Rh-negative and her serum is found to contain anti-Rh agglutinins, the diagnosis is strongly supported.

A change in the method of selection of blood donors in certain cases is urgently needed. This applies particularly in the case of transfusion of recently delivered women and, above all, whenever there is any suspicion that the present infant is affected with erythroblastosis or when there is any previous history of the birth of jaundiced babies or of stillbirths without obvious cause.

At the same time, a modification of the present method of testing for compatibility between the bloods of donor and recipient must be made. Methods for carrying out these tests are described, and compromise procedures are discussed for cases in which there are no facilities for making these tests.

It is recommended that every blood bank takes steps to establish a panel of group O Rh-negative donors whose blood will be available, first, for the transfusion of the cases referred to above, and, secondly, for use as a routine in the transfusion of infants affected with erythroblastosis (when transfusion is required).

We should like to thank the staff of the Hospital for Sick Children, Great Ormond Street, and the following medical officers, all of whom have given us much help by drawing our attention to cases and allowing us access to them, and in many instances by collecting samples and supplying very useful clinical information: Drs. J. F. Ackroyd, M. Bannister, A. B. Bentall, R. K. Bowes, D. Daley, P. Dingle, A. B. Field, V. B. Green-Armytage, L. G. Higgins, Evan Jones, H. M. M. Mackay, H. Levy, R. G. Macfarlane, J. Murray, J. V. O'Sullivan, E. B. Petrie, M. M. Pickles, R. B. K. Rickford, R. C. Thomas, R. B. Tulk-Hart, Janet Vaughan, and Prof. Young. We should also like to thank Dr. J. F. Loutit for help and facilities in carrying out this work.

REFERENCES

Aubert, E. F., Boorman, K. E., Dodd, B. E., and Loutit, J. F. (1942). *British Medical Journal*, **1**, 659.
Davidsohn, I., and Toharsky, B. (1942). *Proc. Inst. Med.*, Chicago, **14**, 143.
Diamond, L. K., Blackfan, K. D., and Botv, J. M. (1932). *J. Pediat.*, **1**, 3, 269.
Dienst, A. (1905). *Zbl. Gynäk.*, **29**, 12, 353, 651.
Hawksley, J. C., and Lightwood, R. (1934). *Quart. J. Med.*, **27**, 155.
Jonsson, B. (1936). *Acta path. microbiol. scand.*, **13**, 424.
Landsteiner, K., and Wiener, A. S. (1940). *Proc. Soc. exp. Biol.*, N.Y., **43**, 223.
—— —— (1941). *J. exp. Med.*, **74**, 309.
Levine, P. (1941). *Amer. J. Obstet. Gynec.*, **42**, 165.
—— Burnham, L., Katzin, E. M., and Vogel, P. (1941). Ibid., **42**, 6, 925.
—— Katzin, E. M., and Burnham, L. (1941). *J. Amer. med. Ass.*, **116**, 825.
—— and Polayes, S. H. (1941). *Ann. intern. Med.*, **14**, 1903.
—— and Stetson, R. E. (1939). *J. Amer. med. Ass.*, **113**, 126.
Mollison, P. L., unpublished observations.
—— and Young, I. M. (1942). *Quart. J. exp. Phys.*, **31**, 359.
Taylor, G. L., and Ikin, E. W. (1939). *British Medical Journal*, **1**, 1027.
Wiener, A. S. (1934). *J. Amer. med. Ass.*, **102**, 1779.
—— (1941). *Arch. Pathol.*, **32**, 227.
—— (1942). *Amer. J. clin. Path.*, **12**, 302.
—— and Peters, H. R. (1940). *Ann. intern. Med.*, **13**, 12, 2306.

The Queen has expressed her great interest in a plan launched by the Central Council for the Care of Cripples to open a new residential home and school for severely crippled boys, and has sent a donation of £1,000 which had been placed at her disposal by members of the "Bundles for Britain" branches in America to be used for the children of this country. The council has been deeply impressed with the great need for more homes in the reception areas for severely crippled children, who cannot easily move about and whose parents are often unable, under war conditions, to care for them adequately. The Shaftesbury Society, one of the council's affiliated members, which has had wide experience in running homes, has agreed to open this new home provided the necessary capital of £10,000 can be raised. About half the sum has now been promised.

OPTIMAL PROPORTIONS OF ANTIGEN AND ANTIBODY IN TESTS FOR Rh ANTIBODIES

BY

G. L. TAYLOR,* M.D., Ph.D., M.R.C.P.
R. R. RACE,* M.R.C.S., L.R.C.P.
AILEEN M. PRIOR,* M.Sc.

AND

ELIZABETH W. IKIN,* B.Sc.

(From the Galton Laboratory, Department of Pathology, Cambridge)

That the extent of the reaction resulting from mixing homologous antigen and antibody in a test-tube depends very largely on the proportions of the two reagents in the mixture has long been known. The proportions optimal for reaction can be determined (Dean and Webb, 1926; Duncan, 1932), but, while a particular antigen and its antibody will in suitable proportions produce a very well marked reaction, it may be possible, by varying the relative amounts of the same reagents, to get a mixture in which no reaction can be seen. Goldsworthy (1928) found that a specific antibody in the serum of a patient suffering from hydatid cyst of the lung could easily be missed unless the serum and the antigenic fluid, obtained from echinococcal cysts in the livers of cattle, were mixed in proportions suitable for producing flocculation. Workers with precipitins and bacterial agglutinins are familiar with zone phenomena due to the varying proportions of antigen and antibody in the different mixtures of titrations. Some human sera containing iso-agglutinins of the A–B–O system of blood groups show zoning: in titration with homologous red cells the best reaction does not take place in the mixture in which the iso-agglutinin is strongest, but in one in which it is more dilute, so that in a titration there is a pro-zone of one or more tubes in the series before those in which reactions are greatest. Although on very rare occasions a serum may be encountered which will show no agglutination with appropriate cells unless it is suitably diluted, zone phenomena give little trouble in testing for the A–B–O groups.

We have recently examined a sample of human serum containing antibodies for the Rh blood-group factor of Landsteiner and Wiener (1941). Used undiluted, this serum agglutinated the red cells of strongly positive reactors to anti-Rh, but failed to agglutinate cells from more weakly positive reactors. When, however, the serum was suitably diluted, definite and clear-cut agglutination was obtained with these weaker cells. Landsteiner and Wiener found marked differences in intensity in the reactions given by the red cells of different Rh-positive persons. Wiener (1942) mentions that with some human anti-Rh sera, used undiluted, reactions were inhibited until the sera had been heated at 56° C. for 10 to 20 minutes; the behaviour of the serum we describe was unaffected by heating. We obtained the serum in the middle of July, 1942, from a mother (B.)—of group O—who on Nov. 6, 1941, gave birth to a female child (her second), which died of erythroblastic anaemia on Nov. 16, 1941. B. is Rh-negative; a daughter born 2½ years ago is group O Rh-positive.

The Rh Factor

Red cells containing Rh react with immune sera prepared by injecting rabbits or guinea-pigs with the blood of rhesus monkeys. The factor is inherited as a simple Mendelian dominant and is present in about 85% of American whites. Boorman, Dodd, and Mollison (1942) have found a similar distribution in England. The examination of a small series of

* Working on behalf of the Medical Research Council.

negro bloods suggested there might be racial differences in distribution, and very recently Landsteiner, Wiener, and Matson (1942) found only one Rh-negative person among 120 full-blooded American Indians, whilst among 155 Indians of mixed ancestry the distribution of the Rh factor was intermediate between that for whites and pure Indians, according to expectation. Antibodies for Rh do not normally occur in human plasma, but when Rh blood is given to some of the persons lacking the antigen the body recognizes it as foreign and eliminates it. At a first transfusion the haemolysis may be so gradual as to be unsuspected, but Rh antibodies may then be produced, and Rh-positive blood given at a later transfusion may cause the most serious reactions. Immune antibodies to Rh may be responsible for reactions in women, transfused for the first time, who have recently given birth to a child or had a miscarriage or stillbirth, the antibodies having been formed in response to Rh antigen present in the foetus and inherited from the father but absent in the mother. Such antibodies produced in a mother against an antigen present in her foetus but lacking in herself may be passed through the placenta and may react with and damage the red cells of the foetus, and it seems certain that erythroblastosis foetalis, a familial haemolytic disease of the newborn, is caused in this way and that the antigen most commonly involved is Rh. As most donors are Rh-positive it is of the greatest importance that anti-Rh in the serum of any recipient shall be detected. Human sera containing anti-Rh in sufficient strength are probably the most convenient reagents for detecting Rh.

Technique

The serum of B. was tested, by a technique similar to that used by Landsteiner and Wiener, against the red cells of a panel of known positive and negative Rh reactors of group O. Equal volumes—about 0.05 c.cm.—of the undiluted serum and of red cell suspension consisting of 4 to 5% of whole blood, as judged by eye, were mixed in 2 in. by 1/4 in. precipitin tubes, on which glass caps were placed to prevent evaporation during storage. The tests were made in duplicate, and one set was stored for 2 hours and read at room temperature, while the other was stored in a room at about 37° C. and read there after the same time. The reactions were read by disturbing the sedimented cells in the tubes as gently as possible, and looking for macroscopic agglutination by holding the tube to the light. Some of the contents of any tube that did not show agglutinates visible to the naked eye were transferred to a microscope slide and spread by means of the stem of a Pasteur pipette, using only just enough pressure to ensure that the cell suspension was plainly visible under a low power of the microscope.

The sediment in the tubes was examined, before it was disturbed, by inspecting the base of the tube. Landsteiner and Wiener stated: "Negatively reacting bloods then show a circular deposit with a smooth edge, while positive bloods have a wrinkled sediment with a serrated border or show a granular deposit. From these readings, as a rule, the diagnosis can readily be made." We are sure that what Landsteiner and Wiener say about reading the sediments is quite correct, but we are not yet expert enough to rely as much on this type of reading as on seeing agglutinates themselves either by the naked eye or under the microscope.

Titration Tests

When it was found that the undiluted serum failed to react with some cells known to be Rh-positive these anomalous cells were examined by a titration method. Series of falling dilutions —undiluted, 1 in 2, 1 in 4, etc.—of the serum in equal volumes of normal saline solution were prepared, and equal volumes of cell suspension were added to each tube of a series. When the titrations were read it was seen that the serum produced a well-marked zone, with the earlier tubes showing little or no reaction, but with quite definite reactions in later tubes of the series.

In the Table are shown the results of the titrations with the red cells of four group O Rh-positive persons. There are marked differences in intensity in the reactions given by these persons, and without titration Nos. 3 and 4 would have been taken as negative. Of 14 lots of group O Rh-positive cells in an experiment of which the four examples in the Table are part, five were like Nos. 3 and 4 and would have been diagnosed as negative; they all showed clear-cut reactions in the later tubes of the titration. Duplicate titrations were stored and read at room temperature (21.9° C.): the reactions were much less marked, and No. 4 of the Table and another set, positive at 37° C., gave no reaction even on titration. Levine and Katzin (1940) found a human serum containing anti-Rh which had a greater degree of activity at 37° C. than at lower temperatures, and Mollison and Taylor (1942) have reported that the human anti-Rh sera they have examined react better at 37° C. than at room temperature.

As Landsteiner and Wiener indicated, the reactions given by some sera and some Rh-positive cells are very uncertain.

Table showing Titration of B.'s Serum with Cells of Different Rh-positive Persons (Tests Stored for 2 Hours and Read in Room at approximately 37° C.)

Tube No.	Serum Dilution	Cells			
		I	II	III	IV
1	1/1	V	w	—	—
2	1/2	V	++	w	—
3	1/4	C	V	(+)	(+)
4	1/8	C	V	+	w
5	1/16	C	V	++	++
6	1/32	V	V	w	w
7	1/64	++	V	w	w
8	1/128	V	+	(+)	—
9	1/256	w	—	—	—
10	1/512	w	—	—	—

Order of strength of reaction: C>V>++>+>(+)>w
No reaction is scored as negative without a microscopical examination; reactions weaker than V were determined with a microscope.

C = Clumps of cells in clear surrounding fluid visible to naked eye.
V = Somewhat weaker reaction, with clumps distinctly visible to naked eye, although surrounding fluid is not clear.
++ = Very big clumps under microscope; + = not quite such big clumps (+) = less than +.
w = Definite weak reaction in which there is a uniform distribution of very small clumps of about 6 to 8 cells.

and the intensity of the reactions between the same reagents varies somewhat on different occasions. Sometimes B.'s serum, undiluted, has given a slight reaction, "w," with some of the cells with which on other occasions it reacted only when diluted.

Identification of the Antibody in B.'s Serum

The Rh groups of the panel of donors mentioned above had been determined with sera which had been shown to contain Rh antibodies by comparing their behaviour with that of an anti-Rh serum very kindly sent to the Medical Research Council by the Rockefeller Foundation of New York. All of a panel of 18 group O donors—15 Rh-positive, 3 Rh-negative —have been correctly diagnosed by B.'s serum. Paterson, Race, and Taylor (1942) stated that "when the reactions given by a known and an unknown antibody and the same panel of red cells are identical the odds in favour of the two antibodies being the same can easily be calculated. The probability that the apparent identity of the two antibodies is due entirely to chance is given by the formula $\frac{a!\ b!}{n!}$, where n is the number in the panel and a and b the numbers of positive and negative reactors." Applying the present figures, we get $\frac{15!\ 3!}{18!}$,* or $\frac{1}{816}$, as the probability that the identity of the results is due merely to chance; in other words, the odds in favour of the antibody in B.'s serum being anti-Rh are 815 to 1. Members of groups other than O have also been properly diagnosed for Rh by B.'s serum, suitably absorbed to remove anti-A and anti-B.

Titration Advisable

Since discovering the necessity for titrating B.'s serum we have, when testing for the presence of Rh antibodies, never been satisfied they were absent until examination by the titration method—6 or 7 tubes—had been made. If B. had needed a transfusion a direct test between her serum and the cells of, say, No. 3 or 4 in the Table would not, without titration, have disclosed the incompatibility. It appears advisable to use a titration method in direct tests between the serum of a recipient and the cells of potential donors if the Rh factor may be involved; and it may be that in some cases titration will prove to be the only method of disclosing incompatibility due to other blood-group factors.

* 3! = "factorial three" = 3×2×1 = 6.

Summary and Conclusions

The anti-Rh-containing serum of the mother of a baby which died of erythroblastic anaemia caused, when used undiluted, the agglutination of red blood cells of strongly positive reactors to anti-Rh, but failed, undiluted, to agglutinate more weakly reacting cells. When these weakly reacting cells were added to serial dilutions of the serum well-marked agglutination occurred if the serum was suitably diluted. These findings suggest the advisability of using a titration method before deciding that anti-Rh is not present in a serum, and in direct tests between the serum of a recipient and the red cells of potential blood-transfusion donors.

We are grateful to Dr. T. H. Boon, regional transfusion officer, Newcastle-upon-Tyne, and to Dr. S. G. M. Mackay of the Newcastle General Hospital for the trouble they have taken in getting B.'s serum and details of her case.

REFERENCES

Boorman, K. E., Dodd, B. E., and Mollison, P. L. (1942). *British Medical Journal*, **2**, 535.
Dean, H. R., and Webb, R. A. (1926). *J. Path. Bact.*, **29**, 473.
Duncan, J. T. (1932). *Brit. J. exp. Path.*, **13**, 498.
Goldsworthy, N. E. (1928). *J. Path. Bact.*, **31**, 435.
Landsteiner, K., and Wiener, A. S. (1941). *J. exp. Med.*, **74**, 309.
—— —— and Marson, G. A. (1942). Ibid., **76**, 73.
Levine, P., and Katzin, E. M. (1940). *Proc. Soc. exp. Biol.*, N.Y., **45**, 343.
Mollison, P. L., and Taylor, G. L. (1942). *British Medical Journal*, **1**, 561.
Paterson, J. L. H., Race, R. R., and Taylor, G. L. (1942). Ibid., **2**, 37.
Wiener, A. S. (1942). *Amer. J. clin. Path.*, **12**, 302.

PHYSICAL TREATMENT OF ACUTE WAR NEUROSES

SOME CLINICAL OBSERVATIONS

BY

WILLIAM SARGANT, M.B., M.R.C.P., D.P.M.

Deputy Clinical Director of an E.M.S. Neurological Unit

During this war there have been few reports on the actual value of the various physical treatments of acute war neuroses. The methods adopted have had not only to be tested in the last three years but also modified from those employed in peacetime. As things have turned out, they have proved a very valuable part of any comprehensive clinical scheme of treatment and rehabilitation for such patients. The scope of psychotherapy and environmental adjustment for acutely ill patients is somewhat limited: there is little time to-day for intensive psychotherapy, and with the country now organized for total war and subject to random bombing it is not always possible to find an environment where the individual is not exposed to stress and can also be usefully employed in the war effort. The aim of physical treatment is to bolster up the constitution so that unavoidable stresses are better tolerated by the individual. Should active fighting on a second front develop or a renewal of severe air raids occur, the sphere of usefulness of such treatments will be greatly enhanced, and a knowledge of their possibilities is consequently of importance to everybody.

In this unit we have had unparalleled opportunities of testing and developing such methods. After the Flanders retreat we admitted convoys direct from the Dunkirk beaches. Subsequently, months or weeks later, during which time their condition had often gravely deteriorated, acute cases were admitted from other sources. During the Battle of Britain we received casualties from coastal areas and bombed aerodromes, and during the long winter aerial bombardment of London we had to deal with patients suffering from acute neuroses who had broken down after weeks or months of useful service as members of the Civil Defence Services. On several occasions bombs were dropped either on the hospital or in the grounds, and at these times and throughout the raids we obtained very valuable experience at first hand on how to use these methods with a unit of neurotic patients presenting a wide variety of panic reactions.

Since over 3,000 Service cases alone, both acute and chronic, have had to pass through our limited bed accommodation, there has been a pressing need to seek means of accelerating processes of normal recovery, of preventing aggravation of existing symptoms, and of getting patients well enough to return either to readjusted duties in the Services or to some useful civilian occupation. Our aim has been to avoid, if possible, a recovery that is long-drawn-out.

Our most important finding has been the supreme need for immediate first-aid treatment of the acute neurosis occurring in a good previous personality. This is best done by physical methods. Application of treatment should be considered in terms of hours rather than of days or weeks. In this way conditioned fears can be to a certain extent prevented from becoming ingrained in the personality, and neurotic behaviour patterns that were primarily released under severe stress from recurring whenever the individual is again exposed to the slightest danger. We have also learnt that the response to treatment depends not only on the speed with which treatment is given but also on innate qualities of personality. No treatment will endow a patient with qualities of stamina that he never previously possessed. A fundamental constitutional stability under ordinary stresses has been found of overwhelming importance to a good prognosis. Previous general instability offers a very poor one.

First-aid Treatment

For the acute panic state the advantages of heavy sedation given at the earliest possible moment have been amply demonstrated. As a rule too little rather than too much is given. At the first sign of impending breakdown in a good previous personality very heavy sedation, immediately applied to produce unconsciousness for some hours, may stop the development of a neurosis requiring treatment in hospital. The individual's natural stamina is thereby allowed some hours to re-establish itself at a time when his will-power and morale are showing signs of initial failure to cope any longer with the stresses encountered, and he is temporarily open to the acquirement of a wide variety of conditioned fears.

In an emergency alcohol can be used as a means of rapid first-aid sedation, but other chemical methods are preferable. Two to four drachms of paraldehyde, for instance, are very useful, because the drug acts so fast. Six to nine grains of sodium amytal may also be given, or 10 to 20 grains of medinal. But these drugs have the disadvantage of not taking effect for from one-quarter to half an hour. During even this short period the seeds of a future conditioned phobia may be implanted. In the hyperacute condition, especially when the patient is disturbing those around him and destroying their morale, the best method of treatment is the production of immediate unconsciousness by intravenous barbiturates. Whether such first-aid measures will have to be followed by further treatment depends to a certain extent on the physical state of the patient. If he has already lost 1 to 3 st. before he starts breaking down, he probably needs further treatment and rehabilitation, and should be sent back to hospital after these initial first-aid measures. Psychological improvement is rarely permanent if the patient's physique has much deteriorated. However, if the stress has been short-lived though very severe, and if the personality is sound, then deep sleep for some hours may be quite sufficient to enable the patient to carry on his work, especially if initial heavy sedation is supplemented for a day or two by milder sedation.

Breakdown can also be prevented by the judicious use of prophylactic sedation. Courage and will-power have physical components and are certainly not directly dependent on the psyche. Both these attributes of the mind readily weaken if the person is fatigued. Loss of weight, loss of sleep, or even a poor quality of sleep may bring latent weaknesses in the power of resistance to the surface in neurotically predisposed individuals. During a period of temporary crisis the individual's final breakdown can often be averted by the judicious use of sedatives given deliberately to extend to the maximum his limited reserves of nervous energy. Battles are won by hanging on even a few hours longer than the enemy. It was interesting to find soldiers who had been able to go through the stress

of Dunkirk fortified by brandy obtained during the retreat but who made a hopeless showing when faced with a minimal stress in England. If such prophylactic sedation is used occasionally in a crisis, addiction need not be feared in any except severely psychopathic cases. Methods of treatment that are useful for the many should not be rejected because of the weakness of a few. As well as the need for sedatives, there is often an alternative one for temporary stimulants to tide over a few hours of fatigue and stress. Here benzedrine may be found exceedingly useful, and again, in normal persons, there need be no fear of addiction. There has been no real evidence of addiction in non-psychopathic types, despite the current popular phobia; even the neurotic individual does not crave for prolonged sleeplessness, which this drug produces.

Numerous publications during the war have emphasized the value of intravenous injections of barbiturates as an aid to restoring the memory of events for which there has been a hysterical amnesia or to investigating a patient's illness from a psychopathological angle. In addition, however, these drugs are extremely useful as a means of dealing with other acute hysterical conversion symptoms, such as the sudden loss of use of an arm or a leg, immediately they occur. The drug is injected, anxiety is rapidly relieved, being replaced by a sense of well-being, and the patient is susceptible to suggestion and the restoration of function in the part affected. This treatment should preferably be given by the medical officer at the casualty clearing station as soon as the symptoms occur. If they are taken early there may be no need for the patient's transfer to a neurosis centre, unless other symptoms need attention. If acute hysterical conversion symptoms are left untreated for more than a few hours the abnormal behaviour pattern becomes more ingrained and obvious escape mechanisms grow more fixed by the patient's removal to a safe area.

Continuous Sleep Treatment

If severe anxiety or hysterical symptoms have continued for even a week or longer, other treatment is necessary which cannot be done except in hospital, though not necessarily very far from the scene of fighting or bombing. By this time physical changes will have become more pronounced and conditioned fears will have taken a firmer hold. A much longer period of sleep treatment is necessary to destroy these. Any sedative drug can be used. Paraldehyde can be given, orally or rectally, in doses of 2 to 4 drachms every four hours; alternatives are 3 to 6 gr. of sodium amytal at four-hourly intervals, hyoscine and luminal as advocated by Mira, or mixtures of these drugs combined, if necessary, with 2 c.cm. of somnifaine twice a day. The aims of treatment are to avoid undue toxicity, to procure 20 hours of sleep out of the 24, to adjust the dose so that sleep is neither too light nor too deep and patients are roused to take their meals, and to see that during the 7 to 10 days the treatment is being continued the patient receives 3 to 4 full meals a day and is given enough fluid to restore his physique and avoid the dangerous toxic effects of the drugs. At the end of the treatment sedation is slowly reduced. Other measures, which were useless while the acute anxiety and physical deterioration dominated the picture, may then be effective. It is wise to clear up outstanding hysterical conversion symptoms, if they are present, by intravenous injections of barbiturates and suggestion before the treatment is started.

Modified Insulin Treatment

Another interesting group of patients admitted to a neurosis centre comprises the good previous personalities who break down only gradually over a long period of stress and have kept on fighting against their increasing symptoms. After weeks or months of intense strain they may find that they are starting to have anxiety and hysterical responses to stimuli that previously left them almost unmoved. By this time they will probably have lost from 1 to 3 st. in weight and they show a peculiar mixture of anxiety, hysterical, and reactive depressive symptoms in proportions depending on their constitutional make-up. They can be superficially responsive to encouragement and psychotherapy: psychotherapy may, in fact, seem the treatment of choice because the patients are reasonably co-operative, but they quickly relapse under any fresh strain, despite a superficial improvement. If, for instance, they are rapidly cured in this state of a conversion symptom and returned to duty, they are shortly readmitted, more discouraged than before. They are often dubbed malingerers because of the insidious onset of the condition, but the doctor's suspicions as to the true nature of the illness should be roused by the fact that their past record is good. They generally retain insight into their deterioration and are ashamed of it. They cannot control their increasing somatic responses to fear stimuli, however hard they try. This type of patient was most often seen among good A.F.S. personnel who had done excellent work during three months or so of the London air raids before breaking down, and among those who tried to carry on for some considerable time after return from Dunkirk despite an increasing nervous disability. They resemble descriptions of the good type of patient who broke down on the western front in the last war after months of hard fighting and good morale. They should be distinguished from the individuals suffering from hyperacute anxiety state or the purer forms of endogenous depression, so far as physical treatment is concerned. They are best treated by a modified form of insulin therapy, which should be carried out in a base hospital, free from conditions of acute stress. The technical details of this treatment have been described elsewhere (Sargant and Craske, *Lancet*, 1941, **2**, 212). It has been found most useful for fairly rapid restoration of physique and of some degree of working capacity, though the patients are rarely able to return to the full stresses that precipitated their illness. Of the 300 or more patients that we have treated by modified insulin therapy in this unit, these patients and those suffering from mild reactive depression have done best. Often they will gain a stone or more in a few weeks, and the vicious circle of anxiety and loss of weight and increasing incapacity is broken. The fact that they are being given a definite treatment is not without its psychological effect. On recovery these patients should be sent to modified duties or a somewhat less exacting environment, as they remain conditioned to their past experiences and have a horror of being reduced to a similar state again. In some patients the illness has been started initially by a head injury or by blast effects.

Convulsion Therapy

Among the other good personalities that may break down, especially after three years of war, there are many patients who get sent either to neurosis centres or to mental hospitals. Included among them are the over-conscientious non-commissioned officer with many years' service and the valued industrial worker who are particularly prone to break down into a depressive state because of their previous conscientious obsessional personality. Such patients carry on till they are sleepless, retarded, have ideas of guilt, or blame themselves for failing in their excessively high standard of duty or for letting down their comrades or superiors. These patients do not respond well to modified insulin therapy; despite a large intake of food they do not put on weight. Metabolic changes have occurred which are difficult to reverse and are reflected not only in a depressed attitude of mind but also in a general slowness of bodily movement, easy fatigability, and retardation of thought, speech, and even facial expression. Sometimes this distressing condition can be broken up by a long course of continuous sleep treatment lasting up to three weeks, but this will occur in only a relatively small proportion of the patients treated. One may have to wait months, a year, or even longer for spontaneous recovery to occur, even if the patients are immediately discharged from the Army or removed from stress. They are inaccessible to psychotherapy or reassurance. Convulsion therapy, however, should produce a rapid improvement in up to 75% of those patients with a good previous personality and genuine severe depression. Such treatment carries with it a slight risk of fractures, but has not the far from negligible mortality of a long course of continuous narcosis in inexperienced hands. Fractures can now generally be avoided with clinical skill and correct positioning of the limbs and body. If fractures should occur they will rarely cause a period of disability longer than that of the untreated illness. Therefore, if the illness appears likely to be long, this treatment should be considered. The advantages should be weighed against the risks.

Conclusion

It will be seen, therefore, that methods of physical treatment are now available as an aid to shortening the period of total disability in many acute psychiatric conditions. In good previous personalities acute panic states, acute anxiety states, anxiety hysteria, and states of depression now all have their appropriate treatments along such lines. These treatments must, of course, be used in conjunction with other established methods, both psychotherapeutic and environmental, to bring about recovery, restore the individual's self-respect, and diminish liability to further breakdown. Clinical experience greatly enhances their possibilities, just as poor judgment in the selection of cases may rob them of all effectiveness.

NIGHT VISION IN THE ARMY

BY

B. W. RYCROFT, M.D., F.R.C.S., Major, R.A.M.C.

Command Specialist in Ophthalmology

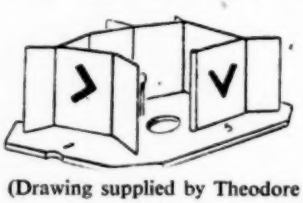
Much has been written on the subject of night vision, which in peacetime has interests of academic value; in wartime, however, the interest must be essentially practical and a contribution to the efficiency of the fighting Services. It follows, therefore, that any investigation of night vision among troops must endeavour to obtain information which will be of value to unit commanders in their conduct of operations.

Briefly such information will consist of: (1) The general state of night vision in the unit as a whole and also in comparison with other similar units. (2) The names of personnel whose night vision is above average and who are especially fitted for night patrols, night leadership, night "spotters," etc. (3) Picked drivers whose night vision is above average and who may safely be trusted to lead a column of vehicles at night in total darkness without lights. (4) Drivers who are night-vision-defective and dangerous in their present military occupations. (5) Contact with the unit as a whole enables an opinion on the general ophthalmic state to be given—e.g., what percentage should be sent for routine examination.

To obtain this information the military specialist in ophthalmology requires portable test apparatus, simple to work and robust in construction, which can be employed throughout the Army to give uniform and standard results. The co-operation of the unit commander is also essential, and, in our experience, is always willingly given in spite of disturbance to training programmes caused by our visits. Thanks to the initiative of the Consulting Ophthalmic Surgeon to the Army, Brigadier Sir Stewart Duke-Elder, the Army now possesses such apparatus, and our experience in 10,000 cases has proved that it fulfils the required criteria stated above.

The Army Night-vision Test

So far as is possible, in any night-vision test, the object is to stimulate the parafoveal and peripheral areas of the fundus. The test object, therefore, in the Army test is a large V mounted in five different positions on a translucent screen behind which is a small bulb run from a dry battery and controlled by



The apparatus. (Drawing supplied by Theodore Hamblin, Ltd.)

a rheostat and voltmeter. The lamp is at varying distances from each of the five screens, which are arranged as an irregular pentagon. The whole apparatus can be rotated so as to bring one screen at a time in front of the patient.

Before examination the soldier is asked the following questions: (1) What is your age? (2) Have you any eye trouble and do you wear glasses? (3) How is your sight in the dark? (4) Do you live in the town or in the country? (5) What is your job in civilian life? (6) What is your job in the Army?

The subject sits at one metre from the apparatus and is rendered fully dark-adapted by wearing dark goggles for 30 minutes; at the end of this period these are cleared of moisture—a most essential procedure—and he then writes down the position of the five V's in turn; his night vision is accordingly assessed. If he sees all five V's his night vision is excellent; if he misses all five it is very bad. Thus, night vision 5/5 is excellent; 4/5, 3/5, 2/5, and 1/5 are average; 0/5 is poor.

All that is required for mass examination at the unit location is a dark Nissen hut divided in two by a curtain. On one side the test is conducted; on the other the men wait in their goggles, and clerical work is carried on with shaded lights.

Full dark adaptation is important: after examination the night vision is recorded in the soldier's personal documents, and a record of the entire unit is made, incorporating the previous questions. It is possible to examine 200 men daily with this test, tabulating results as follows:

TABLE I

No.	Rank	Name	Age	Civil Occupation	Army Occupation	Man's own Remarks	Score	T/C	G.
1234	Cpl.	?	29	Clerk	Driver	Fair	3/5	T	–

T/C = Town or country; G. whether or not the man wears glasses.

Analysis

When the unit has been examined the results are carefully analysed, and classification into three main groups is made thus:

(A) Men whose night vision is above average—i.e., 5/5
(B) " " " " " average—i.e., 4/5, 3/5, 2/5, 1/5
(C) " " " " " below average—i.e., 0/5

The night-vision defectives are further analysed to indicate to the unit commander why these men have failed in the test; they are grouped according to four factors which have influenced their result—namely:

1. *Age.*—Experience has shown that most men over 30 years of age are both slow in the rate of dark adaptation and defective in night vision. This is a general statement for practical purposes and does not hold good in every case: it is adversely affected if the soldier has an error of refraction, and it is improved if he is well educated. After 30 years of age deterioration in night vision becomes marked with the passage of every year.

2. *Defective day vision* influences night vision by errors of refraction especially in myopia, corneal nebulae, familial defects, and other ocular diseases. For convenience and simplicity, all cases whose night-vision defect is thought to be due to any of these factors are placed in this group.

3. *Intelligence* plays a part: it is noticed that officers, headquarters companies, and the more intelligent types of men do well, whereas the man of the labourer class often fails because he does not grasp the significance of the test. The result, however, is not vitiated, as this is not the type of man one would choose for night operations demanding initiative. Careful investigation has shown that environment plays little part: it does not seem to matter whether a man is town-born or country-born, but the opinion was formed that miners were rather better than most of their class.

4. *"No explanation"* has sometimes to be noted when a man persistently fails and when none of the previous factors are in evidence. It may be due to steamy goggles or malingering.

When the unit report is complete it is sent to the commanding officer, and a star is placed against the names of men who are dangerous in their present military occupation—e.g., carrier drivers. An example of such a report is as follows:

Subject: Analysis of Night-vision Tests

To: Officer Commanding,
The Blankshire Regt.

I have the honour to forward the analysis of night-vision tests of your command, carried out on .....

Number tested 656 (622)
Number with excellent night vision—above average.. 373 (298)
Number with poor night vision—below average .. 70 (80)
(Figures in parenthesis are those of another unit for comparison)

Assessment

(*a*) 5/5 is excellent, and indicates particular suitability for night operations.

(*b*) 0/5 is bad. Such cases are underlined in red, with a probable explanation written in red ink alongside.

(*c*) A star indicates that the soldier is dangerous in his present military occupation, which should be changed. (Very careful consideration is given to these cases.)

Remarks

The following factors influence the result of night-vision tests:

(1) *Age.*—Poor results are normal over the age of 30 years, especially if combined with day-vision defects.

(2) *Intelligence.*—Sometimes a soldier does not co-operate, although every encouragement is given. Poor results are always repeated.

(3) *Defective Vision.*—Soldiers wearing spectacles, etc., are always night-vision defective.

(4) "*No Explanation.*"—Indicates a possible technical defect, such as steamy goggles, undue fatigue, etc.

Analysis of Night-vision Defectives

Number defective due to age	18 (37)
" " " " intelligence	14 (19)
" " " " vision	30 (22)
Number of men in whom no cause was obvious ..	9 (2)
Number who are dangerous in their present military occupation	1 (5)

It is interesting to note that in one unit two starred drivers had previously had minor accidents at night, a fact which emerged after their night-vision examination.

Results

The results of night-vision examination must always be viewed in their proper perspective, with a due sense of appreciation of a man's general training and efficiency. Failures must be repeatedly tested before being condemned, and change of occupation recommended only when the soldier himself, having a lack of confidence at night, has failed on the test and holds a responsible position. It is not difficult as a rule to detect the malingerer: the test is completely new and unfamiliar to him. Table II shows results of mass examinations, conducted by various surgeons:

TABLE II.—*Infantry Brigade. Percentage Analysis of Night-vision Tests*

Unit	Total	Over Average	Under Average
Regiment A	100%	31%	7%
" B	100%	29%	11%
" C	100%	32%	11%
" D	100%	33%	14%

Here it is seen that the over-average percentage is strikingly constant for each regiment—namely, about 31%—whereas the figures for night-vision defectives vary somewhat.

TABLE III.—*Percentage Analysis of Night-vision Defectives*

Unit	Total	Defective Vision	Age	Intelligence	No Explanation
Regiment A ..	100%	18%	19%	22%	19%
" B ..	100%	39%	21%	26%	14%
" C ..	100%	33%	19%	25%	25%
" D ..	100%	31%	44%	14%	12%

From Table III it will be noticed that Regiment A has a lower proportion of men who are defective on account of day-vision defects than has Regiment D; these regiments also show parallel figures where the night-vision defect is due to age. In point of fact, Regiment D was a regiment composed of older men and of lower grade than Regiment A, which was a battalion of young men. Regiments B and C may be taken as examples of an average unit.

In this command no treatment has been undertaken for night-vision defects, and apart from the remedy of day-vision defects it is difficult to see how the above figures could be altered. Up to date about 10,000 cases have been examined, and results of analysis comply with those figures obtained for a brigade.

Summary

An analytical and statistical report of night-vision tests in the Army is presented.

The method used, in this command, of making practical recommendations to unit commanders with a view to increased efficiency of night operations is described.

My thanks are due to brother officers who have done so much of this tedious work, Majors C. Heath and S. Smith, and Capt. I. Aubrey, *M.C.*; also to Brigadier Sir Stewart Duke-Elder for his encouragement and advice.

BAGASSOSIS

FURTHER NOTES OF FOUR CASES

BY

J. A. GILLISON, M.B., Ch.B.

AND

F. TAYLOR, M.B., B.S.

Drs. Castleden and Hamilton-Paterson described in the *Journal* of Oct. 24 (p. 478) "an industrial lung disease" which they called "bagassosis." Four men, all from the same factory and suffering from this condition, have been seen by us; two of them were the same as Cases III and IV discussed by the above contributors. Our interest was aroused, first, when one of the men related a series of symptoms which did not fit into any well-known clinical picture, and, secondly, when he remarked that several other men who had worked on his machine—a "bagasse-shredder"—had shown identical symptoms. We therefore asked to see these others.

Characteristic Symptoms

In reviewing our cases—their histories, symptoms, and clinical findings—we were struck by the close similarity existing between them, and by certain outstanding features which appeared to characterize this condition, hitherto unknown to us. These typical details seem worthy of additional emphasis, and are set out as follows:

(1) Each man showed an "incubation period" of approximately the same length, as the time of exposure to bagasse dust before the onset of acute symptoms was from two to four months in all cases.

(2) The acute phase of the illness was of sudden onset—e.g., one was riding home on his bicycle feeling quite well, when, 20 yards from his door, he suddenly felt "winded" and started coughing violently, reaching home with difficulty. Another, at work, "suddenly felt a tightening feeling across the front of the chest, and a severe hacking cough came on."

(3) The cough was particularly violent and continuous for several days.

(4) The sputum was described by the four men in the following colourful phrases: "Dark, and looked and tasted like rotted bagasse." "Green, blue, and dirty, with a foul smell." "Dark and yellow, with a burning taste." "Like manure."

(5) Three men described severe retrosternal pain coincident with the onset of cough and dyspnoea. This was aggravated by movement, and in one case was so severe as to stop his turning over in bed.

(6) All complained of great weakness, which continued for months: one, when "walking to the bus, had to keep stopping for support, was as weak as a kitten, and wished he were dead." Another "wanted to lie down, was hardly able to work at all, and thought he would collapse." Still another, after returning to work, was unable to go up the incline to the station platform.

(7) Less specific, but equally marked in each case, were mental depression and loss of weight and appetite.

Our physical examinations revealed nothing different from the findings of Drs. Castleden and Hamilton-Paterson. It was brought out, however, that exercise tolerance still remained decidedly poor in three of the men, long after the acute phase had passed. (One patient, Case III of previous paper, was noticed to have a central scotoma on the right, due to retinal atrophy—? incidental.)

Results of Investigation

Our investigations, less numerous than those made by Drs. Castleden and Hamilton-Paterson, consisted of *x* rays, bronchoscopy, and bacteriological examination of sputum and bagasse. These were kindly carried out at the London Chest Hospital by Drs. F. G. Wood, H. V. Morlock, and S. R. Gloyne

respectively. All our cases were seen and investigated only in the later stages—1 to 1½ years after the acute onset.

In one case only was there decided *x*-ray evidence of disease. This was in the same man described by Dr. Castleden as his Case IV, whose *x*-ray film was reproduced as Fig. 8. Our film, taken three weeks after Dr. Castleden's, was identical. Dr. Castleden's interpretation is that this case "may be going to resolve or might progress to the fibrotic type of lesion seen in Case II." As the man had worked as a coal-miner for 20 years, is it not more likely that these persisting appearances are those to be expected? The radiologist reports: "General increase in striations in both lungs, the appearances being suggestive of silicosis in the reticular stage." The difficulty in interpreting radiological findings is emphasized by the fact that still another of our cases had been a coal-miner for 13 years.

Bronchoscopic examination showed: (i) Abnormal congestion of the trachea and bronchi; (ii) excessive white frothy mucus; (iii) glazing of mucosae more marked than normal. Examination of bronchoscopic swabs showed no moulds, but in one case "unidentified Gram-positive and Gram-negative bacilli"; in another, "Gram-positive bacilli only"; while a third was sterile—all organisms thought to be contaminations and not pathogenic. The crude fibre showed neither bacilli nor moulds.

An important aspect, other than the purely pathological, is the legal one. In all our cases the men had had a severe and prolonged illness, almost certainly as a result of inhaling the sugar-cane dust, and had lost many working hours. No payment under the Workmen's Compensation Act could apparently be claimed, as the disease is not a scheduled one.

It would seem that we have not sufficient knowledge of this new disease to lay down criteria by which compensation may be assessed. If Dr. Castleden's view is correct—namely, that some patients may develop a permanent lung fibrosis—the importance to the workman of scheduling the disease is clear.

Summary

Some characteristic symptoms following inhalation of bagasse dust are described; difficulties of radiological interpretation and the importance of scheduling the disease are mentioned.

Medical Memoranda

Unusual Skin Sensitivity

The following recent case of abnormal skin sensitivity may prove of interest.

Mrs. A., aged 35, saw me first in Dec., 1940, at my infirmary skin clinic. At that time she was suffering from a reactive eczema which she had had periodically since the age of 7. On going into her history I found that the eruption was much worse 7 days before a period, and began to clear when the period started. With this information I put her on to stilboestrol through her doctor, and I did not see her again until June 23, 1942. She then told me that for the past 18 months she had done very well, and eventually had ceased taking the stilboestrol, but now had a recurrence of her original eczema. I considered merely putting her back on to stilboestrol, but thought that oestroform might be used, as I have known a number of cases respond well to it. She was then ordered 20,000 units of oestroform twice weekly in the 7 days preceding a period. She had these, and a week later the eczema erupted violently, and there were swellings of the hands and feet and other parts, which alarmed her greatly. This reaction, however, lasted only a few days and then resolved, with vast improvement in the eczematous lesions.

I saw her on Sept. 10, when she gave me this remarkable history: While the previously mentioned reaction was taking place she felt her right leg above the knee on the inner side to be extremely hot, and when in bed she pressed the fingers of her left hand against it to relieve the condition. In the morning she was astonished to find that the outlines of all her fingers were visible on this area in the shape of a vesicular eruption. The thumb area was not so well marked, as pressure was not applied with the whole length of this, but all the other fingers were clearly outlined; in addition to this, it was a point of great interest to me to notice that where the wedding-ring had been pressed against the leg the skin was perfectly normal and appeared as an ordinary white band. The marks were clearly visible to me a fortnight later.

This, then, must be a case of sensitivity to her own skin with negative sensitivity to the gold of her wedding-ring, and, I am afraid, merely serves to add to the confusion in the problem of skin sensitivity.

ALLAN BIGHAM, M.D.,
Hon. Dermatologist, Bradford Royal Infirmary.

Reviews

DISEASES OF METABOLISM

Diseases of Metabolism. Detailed Methods of Diagnosis and Treatment. A Text for the Practitioner. Edited by Garfield G. Duncan, M.D. (Pp. 985; illustrated. $12.00 or 60s.) Philadelphia and London: W. B. Saunders Company. 1942.

A generation ago medical textbooks contained a section entitled "Diseases of Unknown Causation," and a little later some of the items under that heading were separated off as "Diseases of Metabolism," adopting a word introduced into physiology by Michael Foster. That this sturdy infant has now reached adult stature is demonstrated by the book before us, which contains over 900 pages. A quotation from Leonardo da Vinci, "The body of everything that takes nourishment dies and is constantly reborn," strikes the keynote. Controversial matters are for the most part omitted, and certain limitations have been adopted as necessary. Thus endocrine disturbances have been included only when directly related to generally recognized metabolic diseases. On the other hand the subjects of nutrition and deficiency diseases find a place as being definitely linked with the subject of metabolism. An account of recent work on the lesser-known vitamins is included.

Of recent years increased attention has been given to mineral metabolism and water balance, and these two topics receive full consideration. The discussion of mercury as a diuretic may be taken as a sample of the style of the book. It is pointed out that although mercury is a general protoplasmic poison the obvious lesions are usually restricted to the gastro-intestinal tract and the kidney, where it causes epithelial necrosis. Diluted to an innocuous concentration in the blood stream, it passes into the glomerular filtrate of the kidney. As water is drawn from this filtrate by the tubules the concentration increases enough to coagulate the epithelial protein and thus checks reabsorption. The alimentary lesions are probably due to a similar process. These lesions are quite superficial and do not involve the basement membrane, so that they are reparable even when quite extensive. This is a useful reminder, however, that when we use mercurial diuretics we are invoking the aid of a pathological process. An interesting statement is made concerning diabetes in childhood, to the effect that in 90% puberty occurs at, or slightly earlier than, the normal time. This certainly would not have been true fifteen years ago. In the early days of insulin therapy, when a diet very restricted in carbohydrate content was the rule, these children were almost always wizened and late in developing. The change to a more ample diet covered by sufficient insulin dosage has certainly worked a great improvement in this respect.

The book is not crowded, as some are, with irrelevant illustrations, and the bibliography is confined within reasonable limits. It will prove a valuable book of reference, and a comparison of it with Von Noorden's great work in three volumes which appeared early in the century will show how completely the outlook on disorders of metabolism has changed in less than forty years. The editor tells us of the encouragement given by Sir Frederick Banting to his undertaking of this task, and the foreword was written by Sir Frederick only a few days before his untimely death.

PICTORIAL AIDS TO ANATOMY

Illustrations of Regional Anatomy. By E. B. Jamieson, M.D. Fourth edition. Section I. Central Nervous System. (50 plates. 8s. 6d., plus 5d. postage.) Section II. Head and Neck. (64 plates. 15s., plus 6d. postage.) Section III. Abdomen. (43 plates. 7s. 6d., plus 4d. postage.) Section IV. Pelvis. (43 plates. 5s., plus 4d. postage.) Section V. Thorax. (33 plates. 5s., plus 4d. postage.) Section VI. Upper Limb. Third edition. (42 plates. 8s. 6d., plus 5d. postage.) Section VII. Lower Limb. (52 plates. 10s. 6d., plus 6d. postage.) Bound volume 60s., plus 9d. postage. Edinburgh: E. and S. Livingstone. 1942.

Notwithstanding a "disaster" which befell the production of the fourth edition of Sections I to V, and the third edition of Sections VI and VII, the printers succeeded in reprinting a new issue of E. B. Jamieson's well-known *Illustrations of Regional Anatomy* before the opening of the new winter session. These have been beautifully executed; 242 colour-blocks have been added, and some of the finer details of dissections have been reproduced on an enlarged scale. The colour in most of the illustrations is a great help in distinguishing the different

parts, and with the very closely printed labels it materially helps in accomplishing the desired result—namely, "anatomy made easy." There is little to criticize in a work so carefully and accurately carried out. Attention may, however, be drawn to Section III, Plate 25, in which the coeliac and superior mesenteric arteries appear to be given off from the unopened abdominal aorta, whereas the "right" renal artery is depicted at its origin from the interior of the aorta; the right half of the aorta is shown below as it would be seen in a sagittal section, but no indication is given of the change from the sectioned to the unsectioned parts. A similar vagueness is present also in Section III, Plate 5, in which the arrow pointing to the blank space which represents the anterior wall of the femoral canal reminds one of the old query whether the term "canal" denotes the watercourse on which the ships sail or the earth-channel which confines the water. In Section VI some of the figures err in being too schematic, and are thus unreal. The general impression, however, which is given by the work is of reliability and an accurate knowledge of what the student needs in order to understand the relations of the dissected parts and obtain a visual knowledge of the general structure of the human body.

DENTAL SURGERY AND PATHOLOGY

Dental Surgery and Pathology. By Sir J. F. Colyer, K.B.E., LL.D., F.R.C.S., L.D.S., and Evelyn Sprawson, *M.C.*, D.Sc., M.R.C.S., L.D.S. Eighth edition. (Pp. 1,067; illustrated. 45s.) London, New York, Toronto: Longmans, Green and Co. 1942.

The task of revising the original work of Sir Frank Colyer was undertaken by Mr. Evelyn Sprawson. It was a notable and important achievement, because since its first publication this has always been the textbook on dental surgery most used by the student. The new (8th) edition has incorporated recent researches and advances both in the theory and in the practice of dentistry, so that the vade-mecum of the student becomes the reference book of the practitioner. In this respect the comprehensive index at the end is most helpful. The early chapters are almost entirely devoted to the various anatomical abnormalities of the teeth and jaws—a dull subject, but one which must be digested by the student to appreciate the principles of orthodontics. These are clearly and simply illustrated, emphasizing the methods of treatment by extraction rather than by the appliances of some teachers. The latter two-thirds of the book has been almost completely rewritten since the reviewer was a student some twenty years ago, and leaves him impressed and even amazed at the painstaking analysis of recent research and published articles. The aetiology and pathology of dental disease are described in detail, and although space has restricted the discussion of treatment in some instances to general principles, there has been no omission of any recent therapeutic measure that has proved useful in practice.

The volume now runs into over a thousand pages and is heavy and uncomfortable to hold. The authors might well consider dividing the work into two volumes in a later edition.

WAR NURSERIES

Young Children in Wartime: A Year's Work in a Residential War Nursery. By Dorothy Burlingham and Anna Freud. (Pp. 81. 1s. 6d.) London: George Allen and Unwin, Ltd. 1942.

To the harassed medical officer bewildered by the multiform difficulties arising out of nursery homes this report will come as a blessing. Not only does it describe the wholly admirable administration of a group of three nurseries (two residential and one for day children), but it includes—with an endearing lack of technical terms—an account of child development and psychopathology so simple and yet so profound that the unlearned in psychology and the experienced psychiatrist alike may read it with enjoyment and profit. The four sections deal respectively with statistics, nutrition, medical report, and a survey of psychological reactions. In the last of these sections, which occupies two-thirds of the whole booklet, the behaviour on which deductions are based is demonstrated with the clarity of a microbiological film. It is clear also, in spite of the restraint shown by the authors, that these nurseries are run with an efficiency, devotion, and human understanding that should serve as a model for others, whether in time of peace or of war.

Notes on Books

TASSMAN'S *Eye Manifestations of Internal Diseases* (Henry Kimpton; 48s.) deals with ocular disease not from the point of view of the physician but from that of the ophthalmologist seeking for a general factor in eye disturbance. The text is encyclopaedic in intention but not in execution. A large number of conditions are listed, but the description both of the conditions and of their correlations is sketchy. The book is essentially an elementary textbook of ophthalmology from which the surgical aspects have been omitted. Its chief value lies in the fact that it stresses, rather more than the standard textbooks, the general basis of ophthalmology.

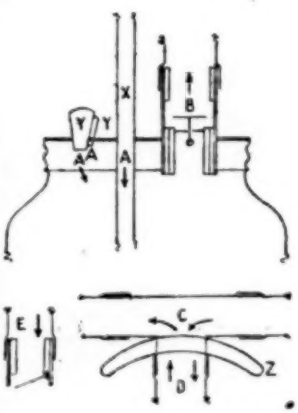
The Board of Education and the Ministry of Health have issued an attractively illustrated booklet, entitled *Not Yet Five*, on the subject of children over 2 in wartime nurseries. The Departments hope that this will serve to enlighten the public generally on the work of the nurseries, and especially to create an interest in it among girls and women of 16 and upwards who are free to take up nursery work. The pamphlet can be obtained from H.M. Stationery Office through any bookseller, price 3d.

Preparations and Appliances

THE SERVICE ETHER VAPOUR APPARATUS

Capt. J. C. H. BROWN and Capt. W. E. COUNIHAN, R.A.M.C., send the following description:

This apparatus, originally called by its designer (J. C. H. B.) the "anaesthetist eliminator," was, as its name suggests, designed to be available for the single-handed medical officer when he had to administer the anaesthetic and then do the necessary surgical procedure. It has not been used as such by me (W. E. C.) in a military hospital, but I find uses for this apparatus, particularly in rush periods. A patient can be left with a degree of safety, and anaesthesia still continues. The sketch I hope will spare a deal of explanation, but the main points are as follows:



Ether container, a 2 lb. jar with a metal screw top. This lid has three inlet (air) perforations (A); one carries a metal tube (X), which can be adjusted to the level of the ether (liquid), the other two being controlled by corks (Y). The vapour is carried to, and away from, the patient by a 3/4 in. bore rubber tubing, which holds in its length a T-shaped metal angle (C), attached to which is an ordinary airway (D). The latter is guarded by a dental-wax mouth-cover (Z), to which head harness may be attached.

The valves are constructed in metal tubes, the inspiratory valve (tube B) being fixed to the metal screw top, the expiratory valve (tube E) fitting into the rubber tubing. The inspiratory valve is a light metal disk lying on a hub in its tube, and being kept in position by a metal pin and shot weight; the former is carried through a metal bar which extends across the lumen. The expiratory valve is a rubber disk screwed to a hub in its metal tube.

The apparatus can be assembled anywhere by a tinsmith, the necessary metal parts and valves being soldered in position. These valves are such that the apparatus is self-administering on inspiration, giving an intermittent flow of vapour with practically no rebreathing. The inspiratory valve unit is an original pattern so far as I can discover, and it will not easily corrode.

The designer (J. C. H. B.), of the Cunard White Star Line, induced patients with open ether, brought them to the stage of surgical anaesthesia, connected the apparatus, and controlled it thenceforth with a sterile forceps, and found it satisfactory. The apparatus has been used by me (W. E. C.) for induction by open ether, or pentothal and open ether, anaesthesia being continued by the patient and the depth controlled by the air entries. When anaesthesia is established the next case can be dealt with confidently without continuous personal attention.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY NOVEMBER 14 1942

THE Rh FACTOR AND ISO-IMMUNIZATION

The discovery that iso-immunization—the immunization of one member of a species by an antigen lacking in himself but present naturally in another member of the species—may cause a haemolytic reaction in the recipient of transfused blood compatible according to the original A–B–O system of groups was bound to be of great importance at a time when so many blood transfusions are being given. But when the story is as exciting as is that of the Rh factor—the red-cell antigen most commonly involved in iso-immunization—and of the establishment of iso-immunization as the cause of erythroblastosis foetalis, the widespread interest shown in Rh by the medical profession and press is only to be expected. It provides one of the most fascinating chapters in the history of laboratory achievement, and began by the finding of Landsteiner and Wiener that the serum of a rabbit injected with the red blood cells of a rhesus monkey agglutinated the red cells of most, but not all, human beings. The positive and negative reactors are called Rh-positive and Rh-negative. Before long, antibodies in the serum of certain recipients who had reactions after blood transfusion were identified as anti-Rh. These recipients were all Rh-negative and either had received previous transfusions or were women who had recently been pregnant. They had been immunized by an earlier transfusion of Rh-positive blood, or, in parous women, by Rh antigen present in the foetus, so that transfusion with Rh-positive blood—and 85% of donors are Rh-positive—was almost certain to lead to trouble. When these reactions were observed in the mothers of babies suffering from erythroblastosis foetalis the connexion of iso-immunization with this condition was quickly established. It results from the iso-immunization of the mother by a red-cell antigen—in most cases Rh—lacking in the mother but present in the foetus and inherited from the father, and the subsequent passage through the placenta of the antibody formed by the mother to act on the susceptible blood of the foetus. These most important discoveries were all made in the U.S.A., and investigations described in this and last week's *Journal* by Boorman, Dodd, and Mollison, and by Taylor, Race, Prior, and Ikin, confirm the American work. Fortunately iso-immunization occurs in only a small proportion of the cases in which the groups of recipient and donor or of mother and foetus make iso-immunization possible; why this is so is not yet understood. Obviously the detection of Rh antibodies and the diagnosis of the Rh factor in red cells are of the highest importance in connexion with transfusions of whole blood where incompatibility due to Rh may occur, and in these cases it is desirable to give only Rh-negative blood. If the position is not certain it may be better to avoid whole blood and use plasma or serum. For transfusing an infant suffering from erythroblastosis, Rh-negative is better than Rh-positive blood; Rh-negative blood has been shown to survive longer. As the mother's blood contains the harmful antibody it should not be given. The ideal donor for such a baby would be Rh-negative, would never have had a transfusion, and would never have been pregnant. Anti-Rh has been found in the sera of women years after their last pregnancy.

Diagnosing the presence of Rh antigen and Rh antibody is a tricky business, and considerable experience is needed for success. Slide and tile techniques used by most people for blood-group reactions are very unsatisfactory in Rh work, and test-tubes are necessary. Incompatibility due to Rh will almost certainly be missed unless the direct matching of the recipient's serum and intended donor's cells has been performed in tubes; and it is advisable to seek Rh antibodies both at room and at body temperatures. With at least one serum containing Rh antibody, incompatibility with some Rh-positive donors would have been undetected if the tests had been made with undiluted serum; that reactions were seen only when the serum was suitably diluted suggests the advisability of performing the tests in the form of a titration.

The Rh factor is of great importance, and no doubt it will be shown to be the cause of many transfusion reactions otherwise unexplainable. But incompatibility due to Rh is far from being the only cause of transfusion reactions, and the antigens and antibodies of the A–B–O system of groups are potentially far more dangerous and will lead to far more reactions unless everything possible is done to avoid incompatibility. The need for careful and complete A–B–O grouping and adequate direct matching is as great as ever; enthusiasm for the new and intriguing Rh factor must not be allowed to lessen the appreciation of this need, and, actually, it ought to lead to revision of the methods used for direct matching.

PLANNING AND THE M.O.H.

When the Medical Planning Commission reassembles next week it will know what the organized groups which make up our profession think of the draft interim report which was laid before it by its various committees. Not the least important of these critical reports will be that of the Society of Medical Officers of Health, coming as it does from men and women of wide experience in administrative and preventive medicine, who are almost entirely whole-time salaried officers. There have now been published[1] not the final conclusions of the society but the recommendations which its own Medical Planning Committee has made to the branches and groups of the Society.

In certain fundamentals the proposals in this report are in line with those set out in the draft interim report of the Commission. It is recognized that the health and medical functions of the various Departments of Government should be brought within one central Government Department—a "real" Health Department. It is agreed that local departments should cover areas wider than those of many existing local authorities. Central and local unification form the administrative basis of the new order. But one finds no signs in this report of any wish to modify the existing "set-up" of local government, except by the creation of local medical advisory committees. Medical representation on local authorities or committees thereof is *not* one of the proposals. There is approval for the conception of the health centre as the focus of local personal health services. The family should be regarded as the health unit, and each general practitioner should have the care in health as well as in disease of a suitable number of persons. The family doctor would "participate" in maternity and child welfare and school medical work for the families under his charge. The number of practitioners working at a health centre would vary according to the type of area, with special arrangements in rural areas. Incidentally the authors of this report recommend that consultants should attend at regular times at health

[1] *Publ. Hlth.*, Sept., 1942.

centres—a view which is not generally acceptable to the consultants themselves.

The principle of unification of local services under a local authority being accepted, it follows that hospital services should be regarded as an integral part of local health services, and not administratively severed from them. Thus the duty of providing hospital services would be the function of the new local authorities in co-operation with the voluntary hospitals and, if necessary, with one another. The suggestion to create *ad hoc* hospital authorities for the administration of all local hospital services is rejected as something which would cause fresh confusion in a field where integration is essential. But it is recommended that all hospitals, voluntary and local authority, should be available for all members of the community on similar terms and conditions. As later proposals show, this in effect means that both types of hospital should be open to all sections of the community.

When we come to the question of staffing, the report diverges sharply from the majority view of the Planning Commission. Naturally, the approach to this question is that of the administrator. Administrative efficiency requires, it is argued, the elimination of private enterprise, as it is called, and the conduct of such services on a whole-time salaried basis. "Hitherto the doctor has been mainly interested in the illness of his patient, but it is of the first importance that his attention should be directed to the maintenance of health." In short the report recommends a national medical and health service on a whole-time salaried basis. Complete free choice, it appears, is not regarded as essential, though the maximum free choice, it is urged, should be given to patients in the selection of their doctors within the organization provided. The words "within the organization provided" will hardly satisfy those who believe that free choice cannot flourish within the confines of a whole-time salaried service. Ample opportunities for study and research would be afforded, especially in the direction of the maintenance and improvement of health, which, it is stated, "hardly thrive in an atmosphere of private competition." There is no direct comment on the arguments advanced by the majority of those responsible for the Commission's draft report that the "cold hand of bureaucratic control," with the doctor acting under the orders of the superior officers, would be inimical to the wise and humane administration of a personal health service. Presumably that and similar arguments are rejected. But in view of the condemnation of what is called private enterprise in medicine, it would be helpful to know whether medical officers of health regard competition for the favour of superior officers or committees as involving dangers as great as those of competition to attract patients. It is clear that they are not satisfied with the existing methods of making appointments, for they go on to recommend the creation of appointments boards to advise authorities in making appointments.

The report recognizes that it is one thing to elaborate a new service and another to create a new attitude of mind. Clearly the medical profession will need a new kind of education before really effective progress can be made. Indeed, there are some who think that if the efforts of planners were concentrated on the recasting of medical education the greatest good would be achieved, even without changes of a legislative or administrative character. The difficulties of the immediate future are recognized. For example, it is suggested that during the period of transition local authorities should be empowered, after consultation with the local medical profession, to determine which method or methods of staffing they consider most appropriate for the hospitals or health centres, or domiciliary practice, in the whole or parts of their area. This proposal has its dangers. A common standard of medical service would not be achieved by creating different standards among medical practitioners. The terms and conditions of any future medical service should be determined, not between individual local authorities and local units of the profession, but at the centre between the Government and the representative body of the profession. They should be determined at the beginning and not at the end.

At the conclusion of this war a large number of young medical men without experience of civilian practice will be seeking careers at home. We must plan for their reabsorption into the country's medical services. That means we must plan now. But it should not mean, and it must not be allowed to mean, that advantage should be taken of this situation to absorb these young men into a form of medical service which, though immediately attractive to the demobilized and maybe temporarily unemployed soldier, is not the best which the Government and the doctors can work out in free negotiation.

POPULATION PROBLEMS

To notice in the same article a report on a new housing estate[1] and a criticism of the Registrar-General[2] may seem bizarre; the connexion is, however, intimate. The report of the Birmingham Social Survey Committee on a sample of families in the Kingstanding Estate in 1939 reaches conclusions not fundamentally different from those drawn by other investigators, notably Mr. Rowntree. The scale of the investigation is small (269 families), but observations relate to a period of steady employment under the shadow of imminent war, and some sensible improvements of technique have been made. Once more the hardships of families with many children under the age of 14 are made manifest. More than 50% of families with 4 or more children under 14 are living on means below the sufficiency level when an absolutely Spartan standard of necessities is used (no holidays, no amusements, no tobacco, indestructible furniture). The percentage soars above 80 when a more realistic measure is used. Of all the children under 14 years of age, 31% were in families on or below the borderline by the first and 60% below sufficiency by the second measure. In other words, large families suffer great privations—a fact which members of the families knew without statistical investigations. Hence the popularity of birth control. A recent apparently well-informed article in the *Times* suggests that neither national enthusiasm nor dictatorial brutality has really had much effect on the effective fertility of the Reich. A brutally efficient Government with spies in every house can do a good deal to check abortions and something to encourage early marriages, but little else.

Dr. Kuczynski's pamphlet is largely a criticism of the memorandum on trends of population issued as a White Paper and the subject of recent controversy in the *Times*. One of the numerous evils of war is that official publications inevitably tend to be propagandist in tone. A broad distinction between enemy and Allied statistical propaganda is that the former makes equal use of the positive untruth and of the *suppressio veri*, while the latter eschews direct lying but is certainly not innocent of suppression. The objection to the memorandum was not that any important statement in it was inaccurate but that, to a general reader, the impression conveyed by it was misleading. Whether the retort—that the document was intended not for general readers but for statisticians—was adequate is a delicate

[1] *Nutrition and Size of Family*. Report prepared for the Birmingham Social Survey Committee. (George Allen and Unwin. 2s. 6d.)
[2] *The New Population Statistics*. By R. R. Kuczynski. (Cambridge University Press. 1s. 6d.)

question. There is much to be said for Dr. Percy Stocks's opinion (expressed in this *Journal* on March 21, 1942) that this is not the time to ventilate grounds for remoter fears, when immediate dangers are so pressing. But Dr. Kuczynski's memoir is much too arithmetical to find many readers in omnibuses, and should be read by publicists who are daunted by mathematics. It ought to deter them from that facile optimism they are so ready to denounce in others.

It is obvious—to use a word which so often means "I cannot prove"—that population will decline unless the conditions mentioned in the first part of this article are remedied, and it is by no means obvious that if they were remedied the decline would be arrested. It is also, if not obvious, at least not very difficult to see, that short views are useless. It is preposterous to point to the fact that total population is not decreasing. The fundamental index—as many vital statisticians have pointed out, not least energetically Dr. Kuczynski—is whether the numbers physiologically capable of bearing children in this generation are replaced by equal numbers in the next generation. If they are not, there must ultimately be a decline which is only masked by the survivorship of those who can contribute nothing to the next generation. When Hamlet dies the play is over; Fortinbras marching across the stage with an army of supers does not affect the issue. It is arguable that, in planning a new world when the black-out curtains have been drawn for the last time, as much patient thinking ought to be devoted to the organization of life on the hypothesis that fertility will not increase, that the population will in fact decrease to a stable figure, as on ways and means of increasing fertility.

HOW MUCH VITAMIN D?

Earlier this year[1] we discussed in a leading article the important question of how much vitamin D should be given to children daily, and in particular doubted whether the official dose of cod-liver oil compound advised by the Ministry of Health was sufficient. "So far as can be made out from the label describing 'cod-liver oil compound,'" we stated, "the daily dose for children from 2 to 6 months old would supply a maximum of 180 units of vitamin D; for older children the maximum amount would be twice this." In estimating how much vitamin D an infant of 12 months would receive from various sources, we concluded that this would come to less than 500 units a day. In the 1936 *Addendum* to the pharmacopoeia the maximum prophylactic dose of vitamin D (calciferol) was given as 1,000 units a day for an infant. The concern that we expressed is now echoed by a special subcommittee of the British Paediatric Association, which has drawn up an informative memorandum on the subject. The subcommittee points out that the minimum requirement for infants and children is not known. According to the Technical Commission on Nutrition of the League of Nations (1938), infants need 400 to 500 international units (i.u.) daily, and therefore, according to this, the Government's prescription would appear to be an adequate supplement to what vitamin D is obtained from other sources. But, in view of rationing and of the wide fluctuations in the amounts of vitamin D in milk throughout the year, the cod-liver oil compound should contain the full daily requirement. The Committee on Food and Nutrition of the National Research Council of the U.S.A., and the Committee on Vitamins of the American Academy of Paediatrics, put the requirements of children from birth up to 15 years of age at from 400 to 800 i.u. daily. Elio and Park,[2] however, recommend 800 to 1,000 i.u. daily for full-term infants. During the last ten years the prophylactic dose of vitamin D given at St. Bartholomew's Hospital has been 600 i.u. The subcommittee points out that the Government cod-liver oil compound would provide 200 i.u. daily for infants under 6 months, and 400 i.u. daily for older infants, taking the maximum dosage for the former as half a teaspoonful daily, and for the latter as one teaspoonful. It goes on to state, "It would be hard to find any authority with clinical experience to support so small a dose; moreover, it will be noted that infants under 6 months are allowed a smaller dose than older babies, which does not accord with their actual needs." It considers that a daily allowance of 700 i.u. of vitamin D would give a wider margin of safety, and suggests that a vitaminized oil should be reinforced with irradiated ergosterol—by which we presume calciferol is meant. Premature infants from birth to two years should receive a daily allowance of 1,400 i.u. The subcommittee makes the excellent recommendation that printed directions should be issued to the mother with the ration of vitamin D. This should tell her to start the oil gradually, beginning with a few drops daily when the infant is a month old, the full dose of one teaspoonful (700 i.u. daily) to be reached at the end of a fortnight. She should be told that a premature infant (i.e., one whose birth weight is below 5½ lb.) is particularly susceptible to rickets, and that the vitamin D supplement must therefore be doubled, to be given in four equal doses daily. Such a supplement should be given throughout both summer and winter. For infants weighing over 5½ lb. at birth the mother should be told that the cod-liver oil need not be given on summer (presumably also sunny) days so long as the infant is out of doors morning and afternoon. A further practical common-sense and obvious recommendation is that the composition and vitamin content per dose of cod-liver oil compound should be given on the label for the information of doctors.

We need only add one comment, and that is that if the daily requirement of vitamin D for infants and children is not known exactly it would seem to be dangerous to recommend a minimum dose, and sound medicine should aim at a dose which, on the evidence available, provides a margin of safety.

[1] *British Medical Journal*, 1942, 1, 47.

JUVENILE DELINQUENCY TO-DAY

The appearance of a report on young offenders[3] was foreshadowed by a circular issued by the Home Office to magistrates sitting in juvenile courts. At the beginning of 1938 the Home Secretary decided to institute an investigation into the problem of juvenile crime, under the director of the London School of Economics, Prof. Carr-Saunders, assisted by two of its staff. A large mass of data from London and many provincial cities was collected and closely analysed, and this report gives an account of the conclusions. After a survey of the most valuable of previous investigations, which forms a useful bibliography for the research student, Dr. Mannheim discusses trends in the incidence of juvenile delinquency and the serious increase from 1933, the year in which the Children and Young Persons Act was passed, to 1938, the last year for which the statistics were reviewed. He summarizes Dr. Rhodes's earlier inquiry into the geographical aspect of the problem, and into the proportion of juvenile to adult crime. Dr. Rhodes himself deals with the present

[2] *Practice of Paediatrics*, edited by J. Brennemann and W. F. Prior, 1942.

[3] *Young Offenders: An Inquiry into Juvenile Delinquency*. By A. M. Carr-Saunders, Hermann Mannheim, and E. C. Rhodes. Cambridge University Press. (7s. 6d.)

investigation under its various heads—the home, the boy himself and his age, the crime, and many other factors which enter into each case. In their conclusions the investigators lay stress on the influence of abnormal conditions in the home, especially broken families and step-parents. They find that the chance of a delinquent coming from a home with an abnormal atmosphere is three or four times as great as from a home with a normal atmosphere, if the structure of the family in both cases is normal. Where both atmosphere and structure are normal they find some association between delinquency and the condition of the home, overcrowding, and irregularity of the parents' employment. The children in the control group (a notable feature of this inquiry) had better records of school conduct and attainment and of attendance at church and Sunday school and were generally a "livelier lot" than the delinquents, who usually seem to be somewhat inferior or subnormal. The authors have not, however, found that any one factor is uniformly associated with delinquency and dissociated from innocence. They draw an interesting comparison between immunity to disease and the apparent immunity to delinquency which they found in some children living under conditions which often produced it. They indicate some lines along which a great deal of further inquiry is necessary. The psychological study which they had planned but could not carry out because of the war is long overdue. Statistical research should, they say, be regular and systematic, and the methods of treating juvenile delinquents should be continually and quantitatively investigated.

SYNTHESIS OF ASCORBIC ACID BY ANIMAL TISSUES

All the animals which have been studied, except guinea-pigs, man and the other primates, and apparently all the higher plants, can synthesize vitamin C, but there is no certain evidence as to the nature of the substance or substances from which the vitamin is formed. The structure of ascorbic acid points to a carbohydrate precursor, and it has been reported by Ray[1] and various other workers that sprouting seeds produced additional ascorbic acid when glucose, fructose, or mannose was added to the medium in which they were growing. Hopkins and others[2] found that the average ascorbic acid contents of the intestinal wall and of the liver of rats receiving a normal mixed diet were the same. When carbohydrate was the only food the ascorbic acid content of the liver immediately became higher than that of the intestinal wall. When carbohydrates were absent from the diet the concentration in the liver fell and that in the intestines rose. No satisfactory explanation of this seemed to be available. Masulin and his co-workers[3 4] found that vacuum-distillable fractions from the unsaponifiable matter of halibut-liver oil, oat oil, grass-leaf oil, and alfalfa-leaf oil given to rats caused a high excretion of ascorbic acid. Sterols, proteins, and sugars did not do this. The substances which caused the increase were so varied in structure (many terpene-like cyclic ketones and various aliphatic compounds) that it was concluded that they were not precursors of the ascorbic acid excreted, but that they stimulated the formation of ascorbic acid from intermediary metabolites. Smythe and King[5] found that tissue slices of liver, kidney, and brain, and muscle extracts or homogenized muscle, from rats which had been given chloretone for at least two weeks, showed evidence of ascorbic acid production *in vitro*, while those from normal rats gave less or no evidence of synthesis. Liver and kidney tissue were more active than brain or muscle. Maximum synthesis was obtained with a substrate consisting of a mixture of pyruvate, glyceric aldehyde, and hexose diphosphate. Mannose, glucose, and *l*-ketogulonic acid were ineffective. The quantities of ascorbic acid synthesized by tissues *in vitro* were enough to account for a large part of the ascorbic acid excreted by chloretone-fed animals, which was often as much as twenty times the amount normally excreted.

1 *Biochem. J.*, 1934, **23**, 996.
2 Ibid., 1935, **29**, 2803.
3 *J. biol. Chem.*, 1939, **129**, 437.
4 Ibid., p. 445.
5 Ibid., 1942, **142**, 529.

NIGHT VISION

It is now recognized that dark adaptation and the determination of threshold values give but a partial analysis of what Air Commodore P. C. Livingstone[6] terms "night visual capacity." The appreciation of form in low illumination is of considerable significance, and is to a great extent a psychological act, some people guessing or construing the form fairly readily, while others do not become aware of the form unless they have much more data at their disposal. These are points of obvious importance in the selection of men in the flying Services. Rigid testing by apparatus for some particular function rather than for the sum total of night visual capacity has therefore proved insufficient. Livingstone describes an apparatus in use by the R.A.F. which is constructed so as to give an approximation to natural conditions rather than to test isolated functions. Perfect muscle balance, at one time regarded as an absolute requirement, has in actual practice proved to be less necessary than it was previously held to be. The experience of one-eyed pilots is in itself sufficient criticism of the older conception, and Livingstone, discussing the components of the physiological consequences of binocular muscle balance, draws a distinction between stereoscopic appreciation, depth perception, and parallax. Here, too, apparatus designed to test these functions in conditions of night landing had to be designed, and Livingstone stresses the fact that, whilst acquired heterophoria is a definite cause of inconsistency in landing aircraft, the inherent type exercises an adverse effect only when the condition is pronounced. Views on the physiology of night vision appear to parallel those on colour vision. When the problems of colour vision as applied to the exigencies of navigation and railroads were first formulated, serious mistakes were made in transferring laboratory findings to the complex situations actually present in life. Further experience made it necessary to evolve tests more conforming to natural conditions, with the result that standards of rejection became more stringent in some directions and less stringent in others. As Major B. W. Rycroft observes in our present issue, "The results of night-vision examination must always be viewed in their proper perspective, with a due sense of appreciation of a man's general training and efficiency." In his analysis of failures Rycroft refers, under the heading of "No Explanation," to "steamy goggles or malingering." That one of the causes of such failures is a psychological disorder was shown in the elaborate study undertaken by Wittkower and his colleagues, the results of which were published in this *Journal*[7] just a year ago.

We much regret to announce the death of Sir Norman Walker, late President of the General Medical Council.

6 *Irish J. med. Sci.*, 1942, **198**, 177.
7 *British Medical Journal*, 1941, **2**, 571, 607.

War Medicine Series

The paper printed below is based on a lecture which was one of a series recently given at the British Postgraduate Medical School, Hammersmith

FOOD POISONING

BY

Sir WILLIAM SAVAGE, M.D., B.Sc.

When we talk about food poisoning we mean acute poisoning. In a technical sense typhoid fever, if the infection is carried in food, is food poisoning, but by usage we mean by food poisoning an illness of comparatively sudden onset following the ingestion of some infected type of food.

Classification of Causative Factors

As regards causation the first is the inherent group—i.e., foods which are inherently poisonous. This applies to many fish found in Continental waters. Ergot could be included, and the best example is, of course, the mushroom, certain types of which are inherently poisonous. The second group consists of comparatively simple chemical poisoning, such as by lead and zinc. I have had to do with an outbreak of poisoning which was due to zinc containers used for cooking apples. A number of cases of antimony poisoning have occurred owing to lemonade and other soft drinks being made in enamelled vessels in which antimony has been used. Lead poisoning among cider drinkers used to be common in certain parts of England, and was, indeed, called Devonshire colic. I have come across cases of poisoning caused by the accidental inclusion of belladonna among the sage with which a hare had been stuffed. Those are all examples of chemical food poisoning. You can recognize them by the special symptoms of the particular chemical—lead, antimony, or zinc, as the case may be—which is involved, and, as a rule, by the short incubation period.

The third group is the large class of bacterial poisons. I have not space to say more about the first two groups, but will deal here with the bacterial group. We can divide the bacteria into four types. The commonest are the various members of the Salmonella genus; then comes a small second group caused by allied organisms, such as those of dysentery. Mr. Bruce White and I first showed that two or three outbreaks were caused by dysentery organisms, and a few years ago a food-poisoning outbreak due to ice-cream which I investigated was found to be due to the Sonne dysentery bacillus. The third group includes certain organisms, now becoming rather important, which act by producing toxins which cause food poisoning. The commonest of these are certain staphylococci—not all staphylococci, but some of them. A few streptococci are also known to have produced this peculiar toxin, and it is fairly certain that there are other organisms with this property. There is an inclination to ascribe many outbreaks of food poisoning to *B. proteus*. Whenever you get decomposing food you invariably find this organism, and the natural tendency is to suppose that it is the cause of the poisoning; but in the very rare instances when it is the cause this is only because the particular strain involved produces such a special toxin, and I believe this very rarely occurs. The fourth group is *Clostridium botulinum* (botulism).

I want to say a word about the things which do not cause food poisoning, and particularly to emphasize that putrefactive organisms do not cause such poisoning. In the lay press, and sometimes, rather disgracefully, in textbooks, we still hear of ptomaine poisoning. There is no such thing as ptomaine poisoning. The concept arose in this way. It was found that when meat putrefied badly crystalline alkaloidal bodies were formed which, when injected into laboratory animals, brought about death with extreme rapidity, and it was assumed that these ptomaines were the cause of food poisoning. This is incorrect. They are late degradation products of food putrefaction, and no one would care to eat meat when it had reached that stage. Further, these effects were produced by *injecting* animals, whereas if the ptomaines were fed to the animals *by mouth*, which is the way poisoning develops, nothing in particular occurred. Putrefaction as such is not a cause of food poisoning. Food poisoning is always due to specific causes—e.g., specific bacteria.

Staphylococcus Food Poisoning

Within the last few years it has been recognized that certain staphylococci can produce food poisoning. They may be contained in any vehicle, but the records show that more than half of these outbreaks arose from cream cakes, éclairs, and things of that kind. The first described outbreak was in the Philippines and was due to infected milk. Cream or custard fillings have been responsible for well over half the number of these outbreaks.

The interesting point about staphylococcus poisoning is that no particular type of staphylococcus is responsible. One cannot say, for example, that the haemolytic staphylococcus acts in that way more than any other type. It is not a specific type. We all know that staphylococci produce a number of different toxins such as haemolysin. These particular strains—and there are comparatively few of them—produce another kind of toxin which we call enterotoxin. Why some staphylococci produce enterotoxin and others do not, nobody knows. They do not constitute a particular group which one can type out and say that these are food-poisoning staphylococci. We know that the presence of starch enhances the virulence of the toxin, and we can take an organism of very low potency and increase its potency by growing it in a starch medium. We know that it produces these effects because we can demonstrate them in sterile filtrates. We do not find this type of food poisoning with merely the presence of a few staphylococci, but usually only when the organisms are present in considerable numbers.

In the early days this association was doubted, and it was only possible to prove it by the fact that volunteers came forward to drink a cultured broth filtrate. Drinking, perhaps, 15 to 20 c.cm. of this filtrate, a considerable proportion of them developed the symptoms of staphylococcus food poisoning. These are generally mildish—nausea, vomiting, and diarrhoea. Having proved it in that way, it was found that if rhesus monkeys were fed on this filtrate they also developed vomiting, but they are not quite so susceptible as man. Lately (this is of practical importance if one is dealing with an epidemic) a reliable test is to make an intraperitoneal injection of the filtrate into young kittens, which show characteristic symptoms. There are bouts of vomiting, general distress, and usually death within a few days. Volunteers, or a monkey, may not always be forthcoming, but we may be able to get a kitten and inject a fair dose of the filtrate intraperitoneally.

The same facts apply to other organisms which produce this type of outbreak. *B. proteus* and streptococci have been mentioned, while outbreaks have been ascribed to *B. coli* and in one or two instances to sporing aerobes. In any individual outbreak such an association can only be accepted with considerable reserve. Not only must the organism be present in large numbers in the implicated food but it must be proved to be a strain which produces enterotoxin. While the demonstration of enterotoxin by the kitten test is suggestive that the strain which produces it is potentially a cause of food poisoning, we are not yet in a position to assert that proof is complete that the strain was responsible for a particular outbreak. Probably enterotoxin production, based on the kitten test, occurs with strains which never cause food poisoning. Quantitative factors enter into the question, and usually the presence of very large numbers of the enterotoxin-producing strain seems to be an essential factor in the ability to set up food poisoning. This toxin is heat-resistant.

I would emphasize that one of the most important facts to ascertain in investigating food-poisoning outbreaks is the interval between the eating of the food and the onset of symptoms. It is one of the vital clues to the type of food poisoning to be investigated. If you have persons who are ill twelve, fifteen, or twenty-four hours after taking food you can be certain you are not dealing with a toxin outbreak.

So much for the staphylococcus type, which may be encountered anywhere in connexion with the feeding of troops or in civil life and which seems to be getting more widely recognized and possibly more common.

Salmonella Food Poisoning

I pass to the Salmonella type. This type used to cause about 70% of the outbreaks in Great Britain. Those of you who are bacteriologists know that there are a great many types of Salmonella. When I started to work on food poisoning forty years ago there were three known types. There are now over eighty recognized types of Salmonella, each said to be different from the rest. It is necessary to remember that only some of them cause food poisoning. Some cause disease in animals only, others in man only, and some cause disease in both man and animals, and it is the last which are responsible for food poisoning. For example, *B paratyphosus* B causes paratyphoid fever but not food poisoning, except possibly in extremely rare instances. In the same way *B. equii* causes disease in horses but not food poisoning. The types which produce food poisoning in man are types which are responsible for disease in both man and animals.

This is not a public health lecture, and I am not going to say more about the large numbers of types except that they are important in later on eliciting the source of the outbreak because each type tends to have its particular habitats. To mention but one example. The Dublin variety of *B. enteritidis* is a bovine type and occurs mainly in calves. That is the type which may be found in milk, and there have been a number of food-poisoning outbreaks from milk due to this strain. On the public health side it is exceedingly important to discover the particular strain, but from the immediate practical point of view it does not matter; they all cause the same symptoms. It cannot be said that one type produces one type of symptoms and one another. True, *B. enteritidis* (Dublin) as a rule causes a mild type, but clinically and pathologically they are indistinguishable in their effects.

There are the following reasons why Salmonellas are so much concerned with food poisoning. The types that cause it are undoubtedly gastro-intestinal irritants, setting up inflammation of the stomach and duodenum and the first part of the tract beyond, and these show redness and signs of irritation. They produce heat-resisting toxins. They grow rapidly on suitable food and, doing so, cause no physical changes in the food. Obviously an organism which can camouflage itself in that way is much more likely to cause food poisoning than one that gives rise to an odour.

Botulism

Botulism is entirely a thing on its own. There are two well-recognized types—A and B—and there is also a C type. It is necessary to remember the types, because if an outbreak of botulism occurs it is of no use to give B antitoxin to a person who is down with Type A. *Cl. botulinum* is a sporing anaerobe which produces perhaps the most powerful toxin we know. There are three things to consider—the bacillus, the spore, and the toxin; and botulism is best understood by examining the salient points of each of these, including the relative resistance. The bacillus and its toxin show no particular resistance to heat. The bacillus is killed, like any non-sporing bacillus, by twenty minutes or so at 60° C. The toxins have no special resistance to heat, but the spores are among the most resistant spores we know, therefore they are apt to survive in heated foodstuffs. The spores as such are not toxic, and if one takes a million spores and washes them so that they have no toxic element, animal experiments suggest they can be swallowed without hurt, provided conditions are not such that they can turn into the vegetative form. Under favourable conditions the bacillus produces toxins which are able to be absorbed from the alimentary tract and to exert their influence on the nervous system. The bacillus is a true anaerobe, and therefore occurs under anaerobic conditions. It is a natural soil inhabitant and, curiously enough, it is found more often in virgin than in contaminated soil. A great many years ago I sent numerous samples of soil from England to Professor Mayer in California, and spores were found in five out of about eighty.

The earlier outbreaks of botulism were in connexion with foods like ham, bacon, and sausages. In a bacon factory the hams are placed one on top of the other; they therefore do not get much air, and if any are contaminated with infected soil the bacillus may grow and produce its toxins. Then there was an alarming wave of botulism in the United States in connexion with canned foods, particularly in California, where the soil is considerably contaminated with this organism. In consequence the factors of heat resistance of this organism have now been worked out very thoroughly, and canners are told in regard to each product exactly to what extent to heat so as to be sure of killing the organism. This varies with the kind of food: for example, lower temperatures are permissible with acid foods. In consequence this danger from commercially canned foods has been removed. The bacillus is a proteolytic organism, which means that it decomposes proteins and breaks them down, giving off an offensive odour. A sour sort of smell is characteristic. It is not invariably present, because it is possible to have a stage at which the proteolytic changes are not sufficiently advanced to give obtrusive signs, although enough toxin has been produced to render the food very poisonous. As a rule both changes are present together.

The Loch Maree outbreak of botulism was due to sandwiches containing wild-duck paste. The eight people who ate those sandwiches died. The cook said she did not notice any changes in the paste, which is natural because wild duck has an odour of its own and, not being a technical person, she might not easily notice any difference. But when, in the laboratory, we inoculated tins of the paste with *Cl. botulinum* and incubated them, we could later readily detect definite changes.

Incidentally, the decomposition changes explain why we have a considerable number of single cases of botulin poisoning. The woman of the house opens a tin, notices that it does not appear good, but takes one spoonful herself to clear up the point. She discovers that it is not sound and throws it away. She dies, but the other members of the family are unaffected.

The organism acts on the peripheral nervous system; it is not a gastro-intestinal irritant. In the initial stages in certain cases there may be gastro-intestinal symptoms—some nausea, vomiting, and diarrhoea—for the first twelve or twenty-four hours, but these pass away. These symptoms are probably due either to a mixed infection or to the proteolytic products causing slight gastro-intestinal disturbance and are not part of the toxic action. The most characteristic symptoms are the following: disturbance of vision appears early, including dimness of vision, mydriasis, diplopia, and loss of reflex to light stimulation; later there is complete loss of accommodation. Another group consists of a feeling of throat constriction and difficulty in swallowing and talking. There may be complete paralysis of the pharyngeal muscles. Eventually there is complete aphonia. General muscular weakness is a characteristic feature, while there may be incoordination of muscle movement. Inhibition of the secretions is characteristic, and especially so is a dry mouth and pharynx.

It is of value to realize that certain symptoms are not found. While in the initial stage diarrhoea may occur, the characteristic feature is marked constipation, and there is an absence of any rise in temperature. Sensory disturbances, including pain, are entirely absent.

The Loch Maree outbreak was the first in Great Britain; since then there have been about three little outbreaks, and that is all we have had. Botulism is a thing to look out for, but it is very rare in Great Britain and comparatively infrequent everywhere.

(This paper will be concluded in next week's issue)

Deaths due to air raids are not normally reported to coroners, and therefore the figures for coroners' inquests in London are no longer a reflection of the number of unnatural deaths. During 1941 the number of deaths reported to London coroners was 8,181, a decrease of nearly 2,000 upon the year before. Of this number just over 3,000 deaths occurred in hospitals and other institutions. The number of people who met their death by accident was 1,253, being 442 fewer than in 1940. The cases of suicide—348—were 190 fewer than in the previous year. Seven verdicts of murder were returned, compared with three in 1940. The deaths due to excessive drinking numbered 44, again a decline on the previous year. In only 6 cases was the verdict returned "Cause of death unknown."

Reports of Societies

FUTURE STATUS OF PHYSICAL MEDICINE

In his presidential address to the Section of Physical Medicine of the Royal Society of Medicine on Oct. 14 Dr. P. BAUWENS discussed the status, present and future, of physical medicine.

Physical medicine in pre-war days, he said, was "rather shapeless and unsatisfactory." Efforts to enhance its position within the existing scheme of medicine and surgery proved disappointing. Many of its practitioners still worked in their departments in hospitals in subordinate positions without full staff status or direct representation on medical committees. One mistake, in his opinion, was made when the Physical Medicine Group of the B.M.A. defined not physical medicine nor its scope or functions but its practitioners, whom it described as "primarily physicians who have a specialized knowledge of the use and application of methods employed in the practice of physical medicine." To inaugurate something, no matter what, by arrogating to oneself a title which could never be accepted by common consent was no mean error.

With the war the demands for physiotherapy were multiplied, but those demands, said Dr. Bauwens, must not be interpreted as a normal development such as might be expected to result from scientific achievement. It seemed to him necessary to start planning—or, rather, replanning, because it existed already in a rather ramshackle form—the physical medicine of the future. The first step should be to recant the definition of the practitioner of physical medicine and replace it by a definition of physical medicine itself. If it was defined as that branch of medical science which was concerned with the maintenance of health and management of diseases and injuries by means of physical methods, the implication clearly was that it served all aspects of medicine and surgery. There was no branch in which physical methods, either diagnostic or therapeutic, had not some application. But physiotherapy departments ran solely by the grace of orthopaedic departments, phototherapy departments were almost exclusively dermatological, electrotherapy departments led a much-resented parasitic existence in *x*-ray rooms, and whole physical medicine departments ran entirely as centres for the treatment of rheumatic and allied conditions. This was deplorable, at least in general hospitals, but it must not be assumed that the rest of the profession were entirely to blame for these tutelages. On paper the "physical medicine man" as a specialist was "not a very attractive proposition," and the principle of "you offer nothing and so you get nothing" had been responsible for the dearth of attractive posts, and the lack of young men choosing this specialty as a career.

Qualifying Examination and Diploma

The escape from this impasse was a special qualification denoting a knowledge of physics, of the effects of physical agents on tissues in health and disease, and of anatomy and physiology applied to movement. A diploma should be created. The discontinuance of the D.M.R.E. Cambridge was regrettable in some ways, but when teaching or examining for the medical electrology part of that diploma he had felt that electrology had outgrown its usefulness as a partner of medical radiology. With the establishment of a diploma in physical medicine, institutions might become aware of the shortsightedness of separating its various sections or running them as dependencies of other departments. That physical medicine in the future would be almost exclusively institutional must be expected. Probably it would exist as special departments in hospitals, health centres, nursing homes, and in connexion with non-medical institutions such as schools and factories. The effect of a supply of medical officers with special qualifications to direct these would be far-reaching and would lead to a higher standard of work, the disappearance of pseudo-science, improved status, standardization of methods, and uniformity in teaching, all of which were sadly wanting at the present time. While Dr. Bauwens was averse from a conception which represented physical medicine as a system of medicine based on special methods of diagnosis and treatment, thus putting it on a level with osteopathy and chiropractic, he equally resented the suggestion that it was in any way menial. It should be regarded as a co-operative branch of medicine.

Some form of higher qualification was desirable to encourage original research. A faculty of physical medicine might be formed, with the diploma as a qualification of membership, and a thesis based on some original work of value as a qualification for fellowship. In due time this might give birth to a chair of physical medicine, but he declined to estimate the gestation period.

NUTRITIONAL ANAEMIA IN CHILDREN AND WOMEN

A discussion on nutritional anaemia in children and women, considered as a wartime problem, took place at the Section of Disease of Children of the Royal Society of Medicine on Oct. 23.

Dr. HELEN MACKAY said that anaemia in the infant, at least in part, was the result of anaemia in the mother during pregnancy. A drop of 10 to 15% in the mean haemoglobin level in infants was certainly significant of deterioration in well-being. Before the war the only British investigators who published average figures for haemoglobin levels for all ages up to the adult were Davidson and his co-workers in Aberdeen: their investigations were made during economic depression and referred to the lowest economic class. Since last autumn she and Dr. Lucy Wills had estimated haemoglobin levels of 850 children and 550 women, nearly all of the working class. They found the largest number of cases of severe anaemia in the age group 6 months to 2 years. Of school children examined 90% had an average haemoglobin level of about 80%, and some 10% were lower than even the Davidson series of poor children before the war. In a series of school children aged 7 to 11, with a mean haemoglobin level of about 85%, treatment with iron or the provision of school dinners produced a significant rise, although the rate of rise was slow. Children of higher economic status in a London suburb were also examined, but here those who were having school dinners did not show a higher haemoglobin level than the others. A small group of factory girls working in a country town and living in their own homes had a higher level than any other group examined last winter, perhaps because they had access to country produce; but a very low haemoglobin level was found in a group of nurses and students working in the country and living in either hospital or billets with no adequate canteen facilities. The mean for these was actually 5.5% lower than Davidson's mean for Aberdeen in 1931-5. Many classes of the community showed a levelling down of haemoglobin since the outbreak of war, though this must be offset among the poorer section of the community by a levelling up as a result of the disappearance of unemployment, the introduction of rationing, and the system of priorities for certain groups of women and children. She suggested that iron therapy and iron prophylaxis should be widely employed, although iron deficiency was probably not the only factor operating.

The Blood as an Index of Health

Dr. LEONARD FINDLAY said that it was a pity that so much of this work was restricted to haemoglobin levels; the red cell count was more dependable. Recently he had had an opportunity of examining 400 children at Oxford, and found that a considerable number of the estimations of both haemoglobin and the red cells were below the normal level. This poorer health of the child resident in Oxford and its environs was most unexpected. If it was due to a dietetic fault, the fault was a peculiar one, because it allowed anaemia to develop while at the same time apparently—to judge from other investigations of a more general character—the height and weight of school children showed no deterioration, but rather the reverse, under wartime conditions. He had been giving additional iron for prolonged periods, but, roughly, he had found no difference between those treated with iron and those not so treated. In some there was a slight rise in haemoglobin at the beginning of treatment, but it went down after a few weeks, and remained down even though the same or a larger dose of iron were given. It was not to be concluded that the highest point to which haemoglobin could be raised was necessarily the physiological level. It seemed more probable

that the iron exerted a stimulating effect, to which, however, the haemopoietic system soon became accustomed. He ascribed the variations he had obtained more to environmental than to dietetic conditions. His conclusion was that the blood picture was not a true reflection of the state of health of the child. A well-developed child might have even lower haemoglobin and red cell values than an ill-developed child. Nor was the blood picture necessarily an index to the iron content of the diet. Iron administered considerably in excess of the body's requirements caused, as a rule, no permanent rise in haemoglobin level. In medicinal doses iron had an irritant effect on the haemopoietic system, and the highest values reached were not maintained.

Iron in the Dietary

Dr. HUGH SINCLAIR agreed that haemoglobin values were somewhat untrustworthy. He gave the figures for nutritional surveys in Oxford and other towns, and said that the results supported Dr. Mackay's contention that there was anaemia, presumably nutritional, among women, though iron was not necessarily the whole story. Rationing had produced a shift towards bread and potatoes and other vegetables, and away from fish, eggs, and meat, so that the iron intake was probably lower than before the war. A dietitian in Oxford had made a preliminary analysis of the diets of 22 families covered by the survey in 1941 and again in 1942. The main difference as between the two periods was the introduction of national wheatmeal bread. In these families it might appear from a study of the food consumed that iron intake had greatly increased. In 1941 it was below the League of Nations standard—not a high one—and in 1942 above it, but it was probable that the considerable increase of iron in the dietary was not very relevant, because in so far as it was accounted for by national wheatmeal flour it was not available owing to the presence of a large amount of phytic acid. Dr. Sinclair also mentioned an investigation into the use of iron cooking utensils. If a potato were cooked in an iron vessel for about 20 minutes, 3 mg. of iron per helping was obtained, or slightly more than with an aluminium vessel, but if an apple were boiled in an iron vessel for only 5 minutes, 19 mg. of iron would be found in the apple, whereas with aluminium the quantity was negligible.

In further discussion Dr. R. H. DOBBS and Prof. R. ELLIS mentioned difficulties in obtaining accurate haemoglobin estimation, especially in cold weather when extremities were "blue." A short paper was read on behalf of Prof. L. S. P. DAVIDSON showing low figures for haemoglobin among 831 infants and children of working-class families in Edinburgh. Dr. C. F. BROCKINGTON considered that, contradictory as the evidence might be with regard to the absorption of iron from the diet, a measure of fortification of the dietary in iron constituents should be undertaken. Dr. J. YUDKIN said that the haemoglobin levels for some 1,100 Cambridge school children were very good, but some Scottish results with which he had also been concerned were poorer. Dr. MARSHALL described the results of 400 estimations made on blood donors at a blood storage depot. The average figure for men was about 100%, and for women during the reproductive period of life 82%.

Dr. HELEN MACKAY, in reply, said that there might be seasonal variations in the haemoglobin level. Dr. Findlay's findings and her own differed profoundly in many respects. She had found, contrary to his experience, that the haemoglobin levels of infants could be kept up satisfactorily by giving iron, not for a period of weeks but for many months, and she believed that these findings had been confirmed in other parts of the world.

D. Skinner and C. S. Keefer (*Arch. intern. Med.*, 1941, **68**, 851) record their observations on 122 cases of *Staphylococcus aureus* bacteriaemia with a review of the literature on experimental infection in animals. Only 22 recovered—a mortality of 81.97%. There was no correlation between the season of the year or the sex of the patient and the occurrence of bacteriaemia. Most of the patients who recovered were under 30. The most frequent portals of entry were the skin, respiratory tract, bones, and genito-urinary tract. Most of the deaths took place in the first ten days. The most constant feature was high remittent fever. Secondary infection took place in 82%.

Correspondence

Prevention of Small-pox

SIR,—The letter on vaccination against small-pox from Dr. Killick Millard (Oct. 31, p. 530) is typical of the prejudiced point of view of present-day anti-vaccinationists. It contains several misstatements which should be corrected.

Vaccination is not "a serious operation," and in my experience it causes considerably less discomfort and incapacity than the usual injections for immunization against diphtheria. Why the prompt and effective steps taken by the M.O.H. for Glasgow to prevent spread of small-pox in that city should have caused a "scare and public alarm" I fail to see. Has the present nation-wide campaign by the Ministry of Health to induce parents to have their children immunized produced such a psychological upset or affected productive efficiency? Again I fail to see it. Would even Dr. Millard on that account advocate discontinuance of general immunization? Surely our aims in the future, as stated by the Medical Planning Commission, must be the attainment of positive health and the prevention of disease, especially such as those mentioned with high mortality and infectiveness.

We are to-day in the position of being exposed more than ever to a country-wide outbreak of small-pox as men return from the East and travel by air becomes general. It is time that the Ministry of Health drew up a campaign for universal vaccination on the same lines as that now being conducted for immunization against diphtheria. Perhaps the two could be coupled up?—I am, etc.,

Tredegar, Mon. ARTHUR HOWARD.

Vitamins and Capacity for Work

SIR,—I am very interested in your leading article on vitamins and capacity for work (Oct. 24, p. 485), and especially your mention of the Mayo experiments, of which I was unaware. I have been trying vitamin B_1 on the accident-prone. I found a great deal of nervous instability among this group and wondered if it was associated with deficiency of vitamin B_1. I therefore chose ten with the greatest number of entries in the accident book, and my firm readily agreed to supply them with tab. aneurin hydrochlor. 3 mg. three times a day for 100 days. Unfortunately, at the end of two months only six of the patients were continuing to take the tablets, so I decided to note the number of their accident entries during these 60 days and also those in the preceding 60 days. The results were as follows: A, 5—1; B, 5—2; C, 7—4; D, 6—2; E, 12—6; F, 3—0. Thus all had a smaller number of entries while taking the tablets, and the total number fell from 38 to 15.

I had planned to repeat the experiment with greater numbers and with controls to eliminate the effects of suggestion, but so far pressure of work has prevented this.—I am, etc.,

Stroud. H. W. HILLS.

What is "Sterile Blood"?

SIR,—I read with great interest Prof. M. R. Drennan's letter (Oct. 31, p. 526) on this subject. I have no experience of the microscopical characteristics of "sterile blood," but the observations Prof. Drennan has made appear to correspond to certain observations I have made on the microscopical appearances of fresh blood films.

An article entitled "Examination of Fresh Blood Films, with Special Reference to Haemoconia" appeared in the *Journal* in 1907—a long time ago, but which I considered of some importance and still relative to many questions under review to-day. Prof. Drennan refers to the "spinning" of the granules of the cytoplasm in white blood corpuscles, and as the white cell breaks up these spinning bodies can be seen floating free in the blood serum. He also refers to "other highly motile bodies in disintegrating sterile blood." These phenomena and many more can be observed in examination of fresh blood films, and can be watched until complete disintegration of the corpuscular elements occurs. This I found took place in about ten days, and was dependent on protecting the film so far as possible from contact with the air. The

method I used was to put a drop of blood on a cover-glass and immediately to place it on a glass slide, protecting the cover-glass from the air by ringing it with rubber solution. Examination of the film was made by dark-ground illumination several times a day. By such a method complete disintegration of the corpuscular elements could be observed with many enlightening phenomena. The film must be kept in cool surroundings or disintegration will be more rapid and difficult to follow. If Prof. Drennan would compare his observations on "sterile blood" with those of fresh blood under conditions which I have indicated, I am sure that he would find greater illumination on an important subject. He would, for example, find that not only movement of granules appears in the white corpuscles but granules appear in the disintegration of the red cells, and which also show movement and finally escape into the serum. Those have the appearance of living entities, and no doubt correspond to those which Prof. Drennan has designated as "vital elements in stored blood."

"Sterile" by dictionary definition means: (1) having no reproductive power; (2) lacking something essential; (3) lacking productiveness or fertility; (4) containing no pathogenic bacteria or other micro-organisms. Prof. Drennan will no doubt agree that "sterile blood" may answer most of those definitions, but the question to be answered is: Are those inherent vital elements, which he ascribes to stored blood, capable of reproduction and a separate entity? I believe that the process of disintegration is one of reproduction, and that disintegration is dependent on that process for its completion. The living cell contains within itself vital elements for its own destruction. It is by the release of those that disintegration eventuates. Complete disintegration of the corpuscular elements of the blood results in serum, so that a further question arises—What exists in the serum? Does it contain something which can be separated and cultivated, or has it now entered the realm of chemistry or biochemistry? There is room for further investigation, which might open many closed vistas and elucidate such problems as cancer and filterable viruses.

I will not further trespass on your valuable space, but I should enter a plea for more examinations of blood and other fluids and tissues by non-fixation and non-staining processes.—I am, etc.,

Edinburgh. FREDERICK PORTER.

Crush Injury and Anoxia

SIR,—Dr. J. Walker Tomb (Oct. 24, p. 495) has rendered great service by his analysis of the crush syndrome. There can be little doubt that the crush syndrome and blackwater fever are similar conditions; even the theories advanced in explanation are the same. Blacklock and Macdonald (1928) suggested that blackwater fever might be due to anoxaemia. Ross (1932) was unable to find an increase in blood lactic acid in malaria, and accordingly rejects the suggestion.

We have a considerable amount of information about the effects of anoxia on renal function. In the anaesthetized animal, anoxia, whether from breathing gas mixtures of low oxygen content (Toth, 1935, 1937, 1940) or from clamping the renal artery (Marshall and Crane, 1922; Barclay, 1942), usually results in a fall in urine volume, and this diminution in volume is accompanied by a rise in *p*H. In the unanaesthetized animal the usual result of anoxia is an increase in urine volume; there may, however, be a drop in volume, and here also the *p*H rises. We have no information as to the behaviour of urinary *p*H when the volume rises, but if the rise is analogous to that brought about by cyanides, then here also we should expect a rise in *p*H. The urine in the crush syndrome appears in general to be low in volume and to have low *p*H values. I suggest that the facts cited make it unlikely that the condition is due, at any rate entirely, to anoxia.—I am, etc.,

The Medical School, Birmingham. JAMES A. BARCLAY.

BIBLIOGRAPHY

Barclay, J. A. (1942). *J. Physiol.* In press.
Blacklock, D. B., and Macdonald, G. (1928). *British Medical Journal*, **2**, 145.
Brassfield, C. R., and Behrmann, V. G (1941). *Amer. J. Physiol.*, **132**, 272.
Marshall, E. K., and Crane, M. M. (1923). Ibid., **65**, 387.
Ross, G. R. (1932). *Blackwater Fever in Southern Rhodesia.*
Toth, L. A. (1935). *Amer. J. Physiol.*, **113**, 131.
—— (1937). Ibid., **118**, 127.
—— (1940). Ibid., **129**, 532.

Tuberculin Skin Tests in "Influenzal Pneumonia"

SIR,—In describing an outbreak of atypical influenza pneumonia at a school Drs. H. G. Herxheimer and A. J. McMillan (Oct. 31, p. 513) do not state whether tuberculin tests were performed, and if so what the results were. With the increasing use of radiological examinations and the coming adoption of miniature radiography on a mass scale, it is becoming necessary for all practitioners to be aware of the value of the tuberculin skin tests; these are now standardized and so simple in performance that there is little excuse for omitting them in every case where the diagnosis of a chest condition is not quite clear. Could Drs. Herxheimer and McMillan assure us with any degree of confidence that these cases of "atypical influenzal pneumonia" were not due to primary tuberculous infection? It is well known that this condition often simulates "influenza" and is too often diagnosed as such. It is to be remembered that the more recent surveys in this country appear to corroborate the findings in Norway, indicating a shift to a later age group of the primary tuberculous infection.

Only two weeks ago I was forcibly reminded of the value of the tuberculin test by the finding of a negative Mantoux reaction in a boy aged 17 who had been kept in bed for nearly 5 weeks in a special chest hospital and subsequently transferred to the special unit at this hospital with a probable diagnosis of tuberculous lesion in the lung. The waste of time and anxiety caused would have been prevented by resorting to this simple test at the very first time of examination.—I am, etc.,

Queen Mary's Hospital, Sidcup. E. MONTUSCHI.

Treatment by Hypnosis

SIR,—Your interesting leader on the present position of hypnosis (Sept. 5, p. 283), besides stirring vivid personal memories, has aroused in my mind speculations of psychological and perhaps philosophical interest. My experience of hypnotic treatment dates back to the year 1910, when, under the title "Notes on a Case of Hysteria," I published in the *Journal of Mental Science* an account of a series of hypnotic experiments carried out at Gartloch Mental Hospital, Glasgow. Briefly, the subject of the experiments, a hysterical youth of 18, exhibited all the classical phenomena of true hypnosis, and would, I think, have satisfied the most exacting requirement of that condition, including those enumerated in your leader. Post-hypnotic commands, for instance, were repeatedly carried out with amnesia in the intervening period, while in the waking state. During actual hypnosis his anaesthesia was so complete that a minor surgical operation was performed upon him without movement, pain, or subsequent recollection, and a detailed account of this was published in the *British Medical Journal* of Feb. 25, 1911.

During the years 1910-14 I encountered several subjects who exhibited this extreme susceptibility to suggestion, and in whom it was possible to induce the classical manifestations of true hypnosis, including, in one case, post-hypnotic olfactory hallucinations. Subsequent experience showed, however, that this type of case was exceptional, and an attempt to induce hypnosis in the ordinary subject rarely, if ever, produced such dramatic results. Indeed, so far as objective phenomena were concerned, there was in most cases little or nothing to prove the existence of hypnosis in the accepted sense of the term, and in this I am apparently in agreement with the writer of your article. On the other hand, it was usually possible to induce a condition of mental quiescence, during which there was, or seemed to be, a heightened suggestibility, and which for therapeutic purposes proved all that was necessary.

Whether there are mental states short of true hypnosis and yet exhibiting the characteristics of increased suggestibility would seem, from the nature of the case, difficult to prove. Personally, I believe that there are, and I have been accustomed to describe them as hypnoidal states, after Boris Sidis, who, I believe, first described them. The nature, and even the existence, of such states may be a matter for speculation, but that they differ *toto caelo* from true hypnosis is, I think, beyond dispute. On the other hand, the few subjects I have encountered who exhibited the classical signs of hypnosis had certain characteristics in common. Apart from their extreme suggestibility they all gave indications of nervous or emotional

instability, two suffered from hysterical attacks simulating epilepsy and were inmates of a mental hospital; one suffered from somniloquism and was undoubtedly of subnormal intelligence; while the fourth was subject to severe attacks of bronchial asthma, of which, incidentally, she was "cured" by hypnotic treatment. The conclusion I have tentatively formed is that individuals who display the unequivocal characteristics of true hypnosis are of relatively poor mental endowments, or show signs of nervous or mental instability of which their extreme suggestibility is only one form of expression.

As regards the question of surrender of personality even in true hypnosis, an amusing incident may be of interest. On one occasion I had hypnotized a girl (one of the four subjects mentioned above) in the presence of lay onlookers, one of whom, thinking to take a rise out of the girl, said to her: "Edith, with whom were you out last night when I saw you?" Quick as lightning came the rejoinder: "Oh, Miss Blank, what a question to ask!"—but she did not vouchsafe the wished-for information. This well-merited rebuff proved at least that the critical and controlling faculties were not in abeyance. As evidence, moreover, of the genuineness of the hypnosis, this patient on waking remarked on the strong scent of violets in the room, the suggestion having been made to her during "the sleep" that she would smell violets on waking. So vivid indeed was the hallucinatory impression that she was not easily convinced that there were not actually violets in the room.

With your leader-writer's general contention that success in suggestive therapy is proportionate to the therapist's own belief in it I am in complete agreement. I would go further, and say that as a rule one is acutely aware of one's power to influence a given subject, and this quite early in the treatment, and that one *knows* when one is going to be successful, and vice versa. The prepotence of the therapist's personality is, I would say, less evident in true hypnosis than in those allied conditions which fall short of it; and as suggestibility reaches its maximal degree in hypnosis, much less is demanded on the part of the physician, the patient, as it were, "doing most of it himself." Moreover, to deprive oneself voluntarily of the advantages of any particular therapy, whether hypnotic or other, merely because one has not reached a complete understanding of the mental processes involved, has always seemed to me irrational, to say the least of it. The truth would appear to be that however much the "modern physician" may wish to objectify his treatment, he is for the greater part foredoomed to failure, for in all that he performs, looks, and says, something of his personality obstinately adheres and clings.—I am, etc.,

J. E. Middlemiss,
Psychiatrist, E.M.S.

Leeds.

Tonsillectomy: Guillotine or Dissection?

Sir,—Mr. T. B. Jobson (Oct. 31, p. 512) discussed the relative merits of the guillotine and dissection methods of removing tonsils. He stressed the importance of removing the whole tonsil. To my mind the success of the operation in children depends largely on whether the adenoids are properly dealt with, and the question whether a remnant of tonsil is left behind or not is of relatively little moment. Indeed, it is often advisable to leave the tonsils alone; a complete adenoidectomy will often be followed by the desired results.

Mr. Jobson remarks: "The removal of a child's tonsils and adenoids in a minute or two by the guillotine is a much less spectacular operation than a set dissection lasting ten times as long." This statement may be a slip of the pen, for I cannot imagine how anyone can remove adenoids with a guillotine unless he uses the La Force instrument; dissection of adenoids would be equally impracticable. However effectively the tonsils are removed in children there is nothing "spectacular" about the operation unless adenoid tissue present in the nasopharynx is completely removed. I have dealt with a large number of cases in children where a perfect tonsillectomy has been performed but where apparently the adenoids have been neglected; the results are generally most disappointing. In my opinion the so-called recurrence of adenoids is a myth, and the explanation lies in the fact that, although much care has been taken to carry out a complete tonsillectomy, the adenoids have been dealt with in a perfunctory manner.

To remove all lymphoid tissue from the nasopharynx is not such an easy matter as is generally supposed—quite as difficult as tonsillectomy. It should be recognized that a sharp curette must be used not once but at least three times. If a small curette is employed the result is that the central portion of the adenoids is removed, leaving the lateral masses of lymphoid tissue in the region of the Eustachian tubes intact. In order to remove these lateral masses the curette is employed on either side. The ordinary curette is liable to leave behind lymphoid tissue situated immediately behind the septum. For removal of this tissue a special curette, which has a ring so small that it enters the upper and back part of the nose, is necessary. Such a curette I have employed for years.

If operators would use the term "adenoids and tonsils' instead of that usually employed it would help to concentrate attention on the really important part of the operation, at least so far as children are concerned.

My anaesthetist, Dr. H. W. Loftus Dale, would like to point out that since the introduction of vinyl ether (vinesthene) we have entirely abandoned ethyl chloride, and have been impressed by the absence of laryngeal or masseteric spasm and vomiting associated with this agent. For the past ten months we have used trichlorethylene for dissection of tonsils and removal of adenoids, and have been favourably impressed by the absence of congestion and any irritation to respiratory tract and diminished bleeding during the operation and the greatly diminished post-operative vomiting. In a very few adult cases a small amount of ether had to be used to obtain enough relaxation to insert the Boyle-Davis gag. In all cases, save in small children, endotracheal technique, with the usual precaution against aspiration of blood and debris, was adopted.—I am, etc.,

Norman Patterson, F.R.C.S.

Aylesbury.

Sir,—Mr. T. B. Jobson is to be congratulated on his temerity in subscribing a discourse on the perennial subject of tonsillectomy, but its almost universal interest is, I think, sufficient justification for a periodical review.

Over the age of 15 or 16 the prevalent complication of peritonsillitis with subsequent fibrotic adhesion of the tonsillar capsule to the bed demands some form of dissection, but there is no valid reason why the guillotine operation should not be a success in practically all cases under this age. In my view the occasionally disappointing results of the guillotine operation can be traced to:

1. Inadequate illumination. There is no need to emphasize that the scientific technique demands a field of operation which is exposed to critical inspection at all stages. How often is this elementary requirement evident in some of the methods still employed to-day?

2. Rushed work. In my experience ethyl chloride anaesthesia alone, unless pushed to extremes, does not give sufficient time to allow for a neat removal of both tonsils and adenoid, particularly if a haemostatic type guillotine is used. A little supplemental ether well administered confers that invaluable extra two or three minutes and a most useful short period of amnesia, which excludes the "psychological trauma" recently discussed.

3. Inexperienced, incompetent, or frankly clumsy surgery. It is in the public interest that the future qualifying examinations should evolve some means of eliminating the ambitious but "ham-handed" potential surgeon, however exalted his theoretic and academic attainments.—I am, etc.,

John Roberts.

Liverpool.

Rehabilitation Centres

Sir,—The memorandum of the British Orthopaedic Association, as amplified by its president (Oct. 31, p. 526), places in excellent perspective the relative parts to be played by the rehabilitation departments of acute hospitals and by special rehabilitation centres—better called "rehabilitation continuation centres"—in the post-war world. But such a picture hardly fits the realities of the situation which confronts us to-day. In how many hospitals where fractures and other disabling injuries are treated is there anything approaching rehabilitation methods as now understood and practised? In the great majority there is either prolonged immobilization, or, at best, a perfunctory prescription of "massage and exercises," with no attempt to provide daily medical supervision of such remedial measures or to fill the patient's day

with a programme of planned exercises, occupational therapy, and organized games all directed towards the prevention of the disability with which he is threatened. As a result, barely a week passes without the transfer to rehabilitation centres of the same dreary list of the products of excessive immobilization—stiff backs, painful wrists and shoulders, flexion deformity of knees, and that most ungainly progeny of fractured tibia out of persistent plaster—namely, "plaster equinus."

The danger inherent in the advocacy of separate rehabilitation centres at this present stage, apart from the undue drain on medical man-power, is the suggestion—implicit, if not actual—that such centres should relieve the hospitals of the essential task of setting up such an organization themselves and of starting the work of rehabilitation within a few days of a patient's injury or surgical operation. As to the bogy of hospitalization, nobody who has watched the changed outlook of orthopaedic patients in hospital after the introduction of a full programme of modern rehabilitation need have any fears on that score. It is not without significance that the E.M.S. has set up its own rehabilitation departments, not in isolated centres of post-hospital activity, but as an integral part of the fracture A departments and orthopaedic centres of the emergency hospitals themselves.—I am, etc.,

Pinderfields Emergency Hospital. HAROLD BALME.

Breast-feeding

SIR,—I have read with concern the letter of Dr. J. Gordon Mathias (Oct. 17, p. 465) regarding breast-feeding. It is such a dispassionate attitude of mind on the part of the family practitioner towards the subject that in many cases undermines the whole structure, both physical and psychological, upon which the success of breast-feeding is built.

I would recall the article by Prof. Charles McNeil (April 4, p. 429) in which he discusses the reasons why the infant mortality rate in this country compares unfavourably with a number of other countries. After reading his carefully considered conclusions one is left with the definite impression that this unfortunate state of affairs finds origin largely in the ignorance of the care of infants by many practitioners. How often during routine ante-natal examination is the question asked: "Do you intend to breast-feed this baby?" Does not this show a wrong mental attitude on the part of the practitioner, immediately conveying a sense of doubt to the mother, thus starting a trend which the practitioner, purely as the result of his dispassionate state of mind, is so often unable to stop.

My impression in this district is that breast-feeding has increased following a better understanding which is largely the result of the national propaganda on the subject.—I am, etc.,

Tenterden. THOS. H. E. TAYOR-JONES.

SIR,—In a letter inspired by Prof. Charles McNeil's comprehensive article Dr. E. G. Housden (Oct. 10, p. 439) raises some interesting points. He says that the most difficult and dangerous period for mother and child in the effort to breast-feed is the four weeks succeeding the return from hospital or the departure of the doctor and/or midwife. With this none would disagree, but it is at this point that continuity of supervision is ensured by the arrival of the health visitor. She pays her first visit before the baby is two weeks old; she can revisit as often as may be necessary. If the mother is up and able to attend the clinic the health visitor may call between the weekly clinic visits if the mother is in difficulties.

While for the sake of order and coherence a clinic serving a large area prefers that patients should attend on the day for their own district, no anxious and harassed mother would be deterred from seeking advice if she reappeared before her visit was due. Although some mothers do come to the clinic to purchase artificial foods cheaply and to exchange chatty gossip, the aim of the clinic is child welfare, and we deplore Dr. Housden's impression that individual attention is impossible. The teaching and encouragement of breast-feeding are a most important aspect of infant welfare, and without individual attention carry little weight. The criterion of success is not number but the efficiency of the service rendered.

Even so, all child welfare workers must be appalled by the small preparation of mothers who breast-feed their babies. When every factor has been considered and every aspect dealt with, the breast milk still diminishes. Almost all protest their willingness to breast-feed, but between desire and determination a great gulf seems to be fixed. Is the female physiological make-up changing, or are endocrine glands becoming less adequate, or should we reverse the "March of Time"?—I am, etc.,

Glasgow. MARGARET ISABEL MCGILL.

SIR,—Letters on this subject are making their appearance again, but surely the mortality rate, which few people seem to consider, is as worthy of consideration as the morbidity, which appears to be an obsession with most. Speaking of infantile diarrhoea, Holt says: "Of 1,943 fatal cases only 3% were breast-fed."—I am, etc.,

Wallington, Surrey. C. R. NUNAN.

"Constipation" in Breast-fed Babies

SIR,—Your correspondents might be interested in an article that was recently brought to my notice by Dr. S. K. Kon of the National Institute for Research in Dairying. It was published by F. W. Clements in the *Medical Journal of Australia* (Jan. 3, 1942, p. 12) and entitled "The Symptoms of Partial Vitamin B_1 Deficiency in Breast-fed Infants." He showed that partial vitamin B_1 deficiency in the food of breast-fed infants led to constipation, which could be cured by the administration of vitamin B_1 either to the infant or to the mother. Failure to gain in weight at a normal rate and vomiting were other symptoms of vitamin B_1 deficiency in breast-fed infants. The effect of administration by the mouth of 500 international units of synthetic vitamin B_1 per day was seen in a week and cure was generally effected within a fortnight. If this response was not obtained it was highly improbable that vitamin B_1 deficiency was the only cause of the symptoms. Dr. Margaret Price (*Journal*, 1940, **2**, 80) has also shown the beneficial effect of vitamin B_1 absorbate upon the weight and length of infants attending a welfare centre in this country.—I am, etc.,

London. W. C. W. NIXON.

Sedimentation Rate and the Sedimentin Index

SIR,—The letters following my paper on the sedimentation rate and the sedimentin index prompt me to reply to some of the points raised.

I wish to express my thanks to "Rural Practitioner" (Oct. 24, p. 497) for having put so aptly into words what I felt after reading the letters of Dr. P. W. Edwards and Mr. L. J. Cutbill and Dr. A. Clark Penman (Sept. 26, p. 379). I should like to raise only one criticism. I do not think that a sedimentation rate carried out on the shaky floor of a moving car could be regarded the same as under "standard" conditions. It is true that we know very little about the laws governing the falling of particles in a standing or alternatively moving environment: I have only observed the samples of blood conveyed after collection to the laboratory, and the bottles from the blood bank taken by car to the bedside of a patient who needs a transfusion in his home.

Dr. G. Day (Sept. 26, p. 379) seems to consider sedimentin as something contained in the plasma and to be looked upon as a constituent of it of the same rank as chlorides, sugar, calcium, etc. This is still to be proved; sedimentin may be a function correlated to the plasma and comparable to the complement or to the α and β isoagglutinins. Be it as it may, I think correction for anaemia to be essential, and am inclined to agree with Dr. Day's second hypothesis that the lowered cell volume is made good by replacement with whole plasma. Cases of pernicious anaemia in relapse show an uncorrected sedimentin index well above 2.0 units, but falling within normal limits on correction; after a few weeks' treatment, when the blood count is normal also, the index is found normal. On the other hand, patients with fractures continue to present a very high sedimentation rate for long periods after the injury. I cannot also understand why Dr. Day considers that indices below 0.5 unit do not make sense; I have observed these more than once, usually in people with normal corpuscular volume who were investigated in the hospital for some condition eventually labelled "hysteria" or "anxiety neurosis." Such symptoms as the patients presented could not have been ascribed to lack of sedimentin.

As for the use of blood diluted with citrate solution, I feel that all estimations should be done on samples with as little interference or dilution as possible. If blood were diluted with citrate solution before estimating the urea or sugar, it would be necessary to correct for the dilution. Why treat the sedimentin differently? Also why does oxalated blood give figures 25% higher than citrated blood? If it is for the dilution 4 parts of blood to 1 part of citrate the figures ought to be 20% higher. If it is for the slowing down due to the sodium citrate the experiments of Ham and Curtis (*Medicine*, 1938, 17, 447) show retardations of from 33 to 46%.

To conclude, I think that the comprehension of the nature of sedimentin would be facilitated by using a common and standard technique, no matter which technique be chosen; it seems to me obvious that the reading of the M.V. is the figure subject to least vagaries. If the haemoglobin instead of being referred to as percentage were reported in one case as grammes of haemoglobin and in another as mg. of iron per 100 c.cm. of blood, confusion would inevitably occur. This is now happening in the case of sedimentin and sedimentation rate.—I am, etc.,

Wolverhampton. B. L. DELLA VIDA.

SIR,—A more careful reading of our letters (Sept. 26, p. 379) would have saved "Rural Practitioner" (Oct. 24, p. 497) the trouble of refuting something we neither said nor implied. We are not averse from tedious and complicated tests providing the results are constant and reliable. Complexity is no absolute criterion of value. On experimental evidence alone we challenge the extravagant claims made for Day's sedimentin index as performed by "Rural Practitioner," who appears to be a close collaborator if not a near blood relation of Dr. Day.

The inconstant effect of temperature on the E.S.R. is shown by these few examples drawn from a large number of duplicate experiments:

Case	M.V. at 65° F.	M.V.	Temperature
(1) E. N.	92	116	53° F.
(2) D. T.	46	32	50° F.
(3) S. T.	10	4·5	50° F.
(4) J. B.	84·5	75	50° F.

Reduction of temperature of the test usually results in the slowing of the E.S.R., but occasionally in rapidly sedimenting bloods the reverse occurs, so one of these has been included in the examples. The discrepancies are not constant, and in No. 3 it is over 50%.

This ignoring of temperature and also perpendicularity of the column of blood when carried out in a motor car—only two of many variable factors influencing E.S.R.—indicates the value which can be put on the small fluctuations of the sedimentin index claimed to be so significant by Dr. Day and/or "Rural Practitioner." Given a standard technique, reliable and consistent results can be obtained by almost any method of estimating E.S.R. The Westergren remains after over 20 years as good as any method and better and simpler than some.

Our protest still stands against the over-elaboration of a useful test and the fallacious and unscientific appraisal of clinical changes on variations considerably less than the experimental error of the method employed.—We are, etc.,

PETER W. EDWARDS.
A. CLARK PENMAN.
Cheshire Joint Sanatorium, Market Drayton. LESLIE J. CUTLER.

Splenectomy in Purpura Haemorrhagica

SIR,—I was very interested in the discussion on splenectomy in purpura haemorrhagica, and ask for permission to add something to it. I believe I have had the longest experience of this operation, and, like a mother naturally follows the ways of her child, I watched its development especially closely since my first cases in Prague. I saw two of the three cases described in my first papers for the last time shortly before I had to leave Prague into exile 3½ years ago, and the third one some years before that. They were all completely free from symptoms and signs of the disease which they had suffered from for many years and which had brought them into constant danger to life. The literature is very great, mostly in America. Dr. Bruce Williamson (Oct. 3, p. 407), who changed his original opinion so profoundly, will not easily find a companion, although there are similar voices (perhaps not quite so definite). The essence of all experience laid down in the medical literature of the whole world is, as Prof. L. J. Witts writes (Oct. 17, p. 466), that the value of splenectomy in purpura haemorrhagica is now a matter of orthodox therapeutics, with *one* condition: that the diagnosis is established beyond doubt by a competent haematologist. And this condition I believe is certainly easily fulfilled in your country.—I am, etc.,

Halifax General Hospital. PAUL KAZNELSON.

The Future of the Profession

SIR,—I belong to that large group of doctors who think it matters little whether the profession becomes a State service or not. What does matter is whether doctors are to be provided with such conditions of life and work that honest and good medical work can be done, and an efficient comprehensive service provided for the community.

It seems to be generally agreed: (1) that present conditions and the present services are defective; (2) that some changes are required; and (3) that those changes should be either towards a State service or towards a radical modification of the existing services. Accepting whole-heartedly the need for change, I think the root problem involved in choosing between the proposed alternatives is bound up in the word "planning."

1. What do we mean when we use that word? Do we mean a rigidly structured professional society in which every individual is given (by authority, I suppose) his exact place and prescribed function? Or do we mean what the biologists would call a patterned professional society? The difference of aim involved in the words "plan" and "pattern" is vital to every organized democracy. In a planned State service a formal rigidity must tend to destroy initiative; in a patterned State service the required regularity and discipline must be attained and preserved. I implore all doctors to consider once again whether their thinking is governed by a philosophy suitable for chemical atoms or by a biological philosophy suitable to human beings (Haldane, J. S., *Philosophical Basis of Biology*).

2. My second question is, What do we mean when we argue about the importance of the right to choose doctor or patient? Who cares what patients are allocated to him provided he can get rid of those he cannot succeed in treating? Who cares what doctor he is sent to provided he can make a change if need arises? Let us keep the real point clearly before us. It is the "right to change," not the "right to choose." Free movement of units is always possible in a patterned society, never in a planned one (*vide* wartime industrial and professional life).

3. We should ask how we can avoid the real dangers of making medicine an "established profession" in which a sterile orthodoxy stifles initiative. Shall we have room within our new services for the really unorthodox doctor? If not, a new "medical Luther" will soon arise, and side by side with "established medicine" will grow up a protestant and nonconformist medicine! If our planners hate vested interests, let them take heed lest they create them. Once again, the root problem is philosophical, of that I am persuaded.

Lastly, we are told (*a*) that the reform of the profession is urgent and should be dealt with now, and (*b*) that no significant change can take place for a long time, and anyhow nothing should be done until the end of the war. Surely the great question should be, What can we personally do, first, to resist static planning, and, secondly, to promote a true patterning of the profession?—I am, etc.,

Worcester. HOWARD E. COLLIER.

Safe Milk

SIR,—Your advocacy of pasteurization is well known, so it is a pity that little appears in the *Journal* about the progress made towards a better solution of the problem of safe milk.

Your leader on bovine tuberculosis (Sept. 26, p. 571) gives very little idea of the range of the discussion on the control of cattle disease reported in the *Proceedings of the Royal Society of Medicine* (May, 1942). From what was said during the discussion it is quite evident that the eradication of bovine tuberculosis in this country is within our reach. In the United States,

Mr. H. T. Mathews said, twenty-five years' efforts have reduced the incidence from an average of 5% to 0.5%. The steps he advocated—extension of the Attested Herds Scheme, calf nurseries, and vaccination—only need to be pressed forward to be successful. Prof. Dalling's use of Wells's vole bacillus in the vaccination of calves seems to show that this will give a better immunity than B.C.G. vaccine.

As to distribution of milk, pasteurization as a means of preserving milk is out of date. Chilling, from the moment the milk leaves the cooler until it reaches the domestic refrigerator (which must no longer be looked on as a luxury), is the method that will come.

It is up to us to encourage these steps rather than to sit back and contentedly advise pasteurization because it has the merit of being easy, while to free the country's herds of tuberculosis will be arduous at first and will call for constant encouragement from those who should know what is right.—I am, etc.,

WILLIAM PICTON.

Cost of Treatment for Tuberculosis

SIR,—I have read the report of the M.R.C. Committee on Tuberculosis in Wartime, and note with pleasure the recommendation that the dependants of tuberculous persons should be given substantial financial help during the period of treatment. From the statement recently made by the Minister of Health in the House of Commons and later on the wireless, it appears that this principle has been accepted by the Government. Is it, however, realized that in many parts of the country, far from financial help being provided, the treatment of the tuberculous patients themselves is not free, and that they are actually assessed on their alleged ability to pay for their stay in a sanatorium?—I am, etc.,

F. D. G. THOMAS,
Assistant Tuberculosis Officer.

London, N.20.

Obituary

ROBERT ESMOND MOYES, M.D.

Dr. R. E. Moyes, who died on Oct. 23, aged 58, had been secretary of the North Northumberland Division of the B.M.A. for eleven years and its chairman in 1932-3, and president of the North of England Branch in 1938-9. He was elected chairman of the Northumberland Insurance Committee in 1937. A colleague writes:

The sudden and unexpected death of Robert Esmond Moyes has stunned a wide circle of friends, both within and without the profession. In all the circumstances of life, both grave and gay, Moyes was an ideal support and companion. Broad-shouldered and broad-minded, he carried the burden of a busy life and practice with a sympathetic sanity.

At Edinburgh University, where he graduated in 1905, he had worked hard and had a host of friends. His father died while he was still a student, and force of circumstances compelled him to go into practice immediately after qualification, and he had to forgo the boon of holding resident appointments. The sacrifices made by his widowed mother before his qualification were ever in his mind, and no son could have done more to give her comfort and support as soon as he found himself in a position to do so. Settling in the colliery village of Broomhill, the practice included patients in the colliery itself and in the surrounding country. Moyes soon made a reputation as a most reliable practitioner. Happily married in 1915, he had scarcely settled in practice when the war called him to the R.A.M.C. and for two years he served in the East. Returning to Broomhill, his practice steadily increased, and there he lived and worked until, some years ago, he moved his home to Warkworth, leaving an assistant in the Broomhill house and surgery. Throughout his 37 years in Broomhill and Warkworth Moyes did a stupendous amount of work both day and night. Starting his round at 8.30 a.m., his widespread practice might have fully occupied his time, but in spite of the daily routine he found time to do much work on committees both of the British Medical Association and of the Northumberland Insurance Committee.

Throughout the years Moyes did his utmost to keep himself up to date in all branches of medicine. No doctor living at a distance from Newcastle was ever a more constant attender at postgraduate classes and medical society meetings, and he served a year of office as president of the Northumberland and Durham Medical Society.

His large practice in colliery and rural areas comprised patients drawn from every grade of society. In pit cottage, farmhouse, and country house it was always the same Moyes. The patient had been thoroughly examined and assiduously attended, and when he called for help the consultation was invariably of his own seeking. There was always the beneficent atmosphere of confidence only met with in the practice of a really good doctor.

Moyes was a sportsman in the true sense of the word, and though the exigencies of his practice curtailed his opportunities, it enhanced the pleasure of both the sport and the companionship. An ideal companion on the golf course, an unselfish shot, and a painstaking fisherman, Moyes was certain of friends and endless opportunities of indulging in the many sports at which he excelled. Having played football for Edinburgh University, he always had an intense interest in the game, and seldom missed the Internationals at Murrayfield. Twice a year a company of friends composed of consultants and general practitioners (the Dormy Club) used to spend a week-end at Silloth for golf. Moyes thoroughly enjoyed these days of complete relaxation; and all enjoyed Moyes, who was sure to have some anecdote, usually some droll episode in his practice, true and humorous, and often told at his own expense.

Having the confidence of his fellow practitioners, it was inevitable that great calls should be made upon his time to serve on committees, and he was an ideal member and chairman of any committee on which he served. He had a natural and spontaneous tact which implies self-restraint, good temper, and quick and kindly sympathy with the feelings and opinions of others. He always seemed to gain his point, yet he never appeared to be in antagonism with anyone. Since 1939 Moyes had enormously added to his already burdensome practice and commitments by doing the work of colleagues in the district who had been called to the Services. During the last two years he had had no time to relax, and it is pretty certain that these strenuous years contributed to his early death.

PROF. HEDLEY WRIGHT, M.D.

Prof. G. S. WILSON sends the following at our request:

The brief obituary notice of Prof. Hedley Wright that appeared in the *Journal* on Sept. 26 needs amplification if due tribute is to be paid to one who occupied a leading position in the ranks of British bacteriologists.

Wright's early work at Edinburgh was concerned largely with serological problems, particularly in relation to the diagnosis of syphilis. During his seven years at University College Hospital, 1923-30, he concentrated his attention on infection and immunity. His careful qualitative observations on the mode of reaction of the rabbit to experimental pneumococcal infection added materially to our knowledge of the clearing mechanism of the normal and vaccinated animal. Two smaller contributions during this period were of importance in starting lines of investigation that were followed up by later workers. A study of two cases of puerperal fever due to pneumococci led him to conclude that infection might be conveyed to the patient from attendants or other persons in the environment; and the demonstration of bacteriaemia within a few minutes of urethral operations paved the way for the observations of Okell and Elliott on the streptococcal invasion of the blood stream following the extraction of septic teeth. From 1930 to 1934, while at Sydney, he interested himself in nutrient media. His finding of bacteriostatic substances in peptone that could be rendered inactive by reduction enabled him to devise a simple method for the preparation of basal media which is now extensively used.

The last eight years of his life, spent at Liverpool, were devoted to the application of bacteriology to public health problems. His work on the laboratory diagnosis of enteric fever did much to improve the current methods and to reform our ideas on the frequency of paratyphoid bacilli in the faeces during the early stages of the disease. His chief interest, however, lay in diphtheria. Taking full advantage of the opportunity that Liverpool afforded him, he studied this disease from different angles, and by a happy combination of bacteriological, epidemiological, and statistical methods, which served as a model for other investigators to copy, he reached conclusions of both laboratory and administrative significance. The whole of Wright's work was characterized by an insight, thoroughness, and accuracy that will remain the inspiration of all who knew him.

WILLIAM FRETSON SKINNER, aged 60, died at Sheffield on Sept. 30. He was the third generation in the practice. His grandfather, William, lectured on anatomy in the Medical School in 1852, and his father also taught anatomy. Educated at Wesley College and University College, Sheffield, with a brief spell in London at U.C.H., he qualified, and after holding a resident post at Chesterfield and a country assistantship he joined his father in a large industrial practice. It soon became too big for him and he took a partner. The partner joined up on the declaration of war, and Skinner was left to work a huge practice scattered to the four quarters of the city by slum

clearance and bombing. Last winter he got a thrombosis in a tibial artery but continued work until it was followed by a coronary thrombosis, from which he died. To this bald account one must add an appreciation of a really remarkable man. One of those men who read little but learn much from experience, he was intensely practical and, I believe, never neglected to make a thorough examination. Possessed of a keen eye and a really uncanny intuition for prognosis, he became an extraordinarily good doctor. He was one of the kindest men, perhaps the kindest, I have ever met. He thoroughly enjoyed his work of visiting the sick and would do anything to help them. There are many anecdotes about this aspect of his character. He seemed to understand his patients and their relatives, and indeed to know the whole family by their christian names and possess their confidence. His shrewdness, powers of observation, sense of humour, and kindliness made it a joy to meet him in consultation. May the profession long continue to possess such members.—A. E. B.

Dr. HERBERT GEORGE HARRIS, who had practised for the last 35 years in Southampton, died at Ashurst in the New Forest on Oct. 3 at the age of 68. For 20 years he was medical officer to the Ordnance Survey Office, and among other appointments he held was that of honorary medical officer to the Hampshire Girls Orphanage. He was educated at Bradfield College and studied medicine at St. Bartholomew's Hospital and Durham University, where he graduated M.B., B.S. in 1898 and M.D. in 1901. At the funeral service his friend Canon R. B. Jolly spoke of the loss which people felt at the passing of a beloved physician, a doctor whom his patients also regarded as their friend. Dr. Harris was the only son of the late Dr. William John Harris of Worthing.

Dr. FRANK ROBINSON, who retired in 1935 from the post of medical officer of health and school medical officer for Cambridgeshire after 26 years' service, died suddenly on Oct. 5. He studied medicine in Manchester and graduated M.B., Ch.B. of Victoria University in 1891, proceeding M.D. in 1895 with a thesis on the clinical features of small-pox, and taking the D.P.H. of the English Royal Colleges in 1901. In 1905-9 he was assistant M.O.H. under the West Riding County Council. During his long period of work for the Cambs. County Council Dr. Robinson lectured on sanitary law and administration to candidates for the D.P.H. of the University. He was a Fellow of the Society of Medical Officers of Health and of the Royal Sanitary Institute. He joined the B.M.A. in 1910 and was president of the Cambs. and Hunts. Branch in 1933-4; since 1938 he had been emergency officer for the two counties and held the post of hon. secretary of the local medical war committee. R. F. writes: The tragically sudden death of Frank Robinson came as a great shock to his many friends. Before his arrival in Cambridge he had acted as medical officer in one of the Liverpool Poor Law Institutions, where he had had extensive experience of both small-pox and typhus fever, two diseases in which he was an acknowledged expert. Just before his death he had been appointed by the Ministry of Health as a consultant for the diagnosis of the latter disease in doubtful cases. During his long period of office under the Cambridgeshire County Council he saw many changes in the public health services. Naturally he had to administer many new developments in the work, and at the end he left a smoothly working service which presented his successor with few difficulties. In his retirement he received many tributes of respect and affection. Though a full-time officer he was, at any rate latterly, a firm believer in the voluntary principle, and many were the voluntary bodies on which he served, either as the representative of the County Council or as a directly elected member, but his interests extended far beyond his daily work. The theme of his life was service, particularly perhaps the service of youth, and no appeal to his generosity went unsatisfied.

The death of Major D. Y. RICHARDSON, R.A.M.C., at the early age of 36, writes a colleague, came as a profound shock to his many friends. Douglas Richardson came to Lincoln in 1934, taking up a partnership in general practice. However, his main interest was in ear, nose, and throat work, and he later took the London diploma in oto-laryngology. Skill in his specialty, coupled with a keen and kindly interest in his patients, led to a rapid increase in consulting work and to appointments at the Lincoln County Hospital and the E.M.S. Hospital at Louth. Volunteering for the Services he entered the R.A.M.C., and was attached to a military hospital as ear, nose, and throat specialist at the time of his death. Conscientiousness in his work and the sincerity of his character, added to great personal charm, made Douglas Richardson very popular with patients and colleagues alike; and they, with a wide circle of friends, will mourn his loss and extend their heartfelt sympathy to his widow and four children.

Universities and Colleges

ROYAL COLLEGE OF PHYSICIANS OF LONDON

At a quarterly Comitia on Oct. 29, with Sir Charles Wilson, President, in the chair, Prof. W. G. Barnard, Major-General A. G. Biggam, Dr. Geoffrey Evans, Sir William Fletcher Shaw, and Sir John Stopford were elected Councillors. Dr. A. E. Clark-Kennedy was re-elected a representative on the committee of management of the Conjoint Board, and Sir Comyns Berkeley a representative on the council of the Central Midwives Board.

The President nominated Dr. W. E. Hume as Harveian Orator and Dr. J. W. Brown as Bradshaw Lecturer, both for 1943, and announced the appointment of Dr. A. H. Gale as Milroy Lecturer for 1944, the award of the Streatfeild Scholarship to Miss Enid E. Sampson, the Jenks Memorial Scholarship to A. J. Graham, and the Linacre Scholarship to C. R. Cheadle.

The following, having satisfied the Censors' Board, were admitted Members:

M. G. C. Ashby, B.M.Oxon., N. D. Compston, M.B.Camb., W. H. Hargreaves, L.R.C.P., E. J. C. Kendall, M.B.Camb., L. Nagley, M.D.Leeds, J. Ll. Penistan, M.B.Lond., E. Petrie, M.B.Lond., J. S. Pippard, M.B.Camb., R. E. Rewell, M.B.Lond., J. F. Smith, M.B.Camb., L. W. Smith, M.B.Camb., R. B. Thompson, M.B.Durham, A. Topping, M.D.Aberd.

Licences to practise were conferred upon the following 274 candidates (including 28 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws:

Patricia R. M. Adlington, J. N. Agate, P. L. Allen, E. Asquith, E. O. Barnes, A. G. Barnsley, H. W. A. Baron, T. T. Bartlett, R. W. Bazeley, Ruth A. Bell, C. P. Bennett, H. H. Bentall, C. Ben-Yallouz, G. G. B. Blackman, J. J. Bligh, S. O. Boldy, P. B. Booth, R. J. Bower, R. A. Bradford, P. W. Brand, K. Braun, A. H. W. Brenan, R. N. Briggs, Ruth M. Burt, P. H. Buxton, N. A. Campbell, A. W. Capon, R. J. D. Carrick, L. S. Castleden, Marjorie E. Chaplin, D. P. Choyce, Ann B. Clark, M. W. L. Clements, P. Coggin Brown, J. A. H. Collyns, D. J. Conway, E. G. Cook, J. B. Cook, Rosemary I. Cook, J. A. L. Cooper, P. F. Cooper, Prudence A. Cooper, M. G. Corcos, J. M. G. Costello, Elizabeth Cullis, C. F. A. Cummins, Joan M. Daniel, O. Daniel, A. S. Davidson, D. P. Davis, H. Davis, W. E. Denbow, R. J. Dickcon, Li S. P. Divers, C. E. P. Downes, J. T. Doyle, J. G. Dumoulin, M. P. Durham, V. Edmunds, H. W. Eldridge, C. J. L. Elsdon, R. N. M. Eminson, J. D. Everall, G. E. Fearn, P. D. Fergusson, M. Fertig, R. J. Forster, G. C. Foster-Smith, M. B. Fox, J. A. Frais, B. L. Frank, P. Fry, D. I. Fullerton, J. O. Gallimore, M. Gamal el-Din, C. D. Garratt, G. E. Garratt, K. O. George, D. Gill, A. E. Ginn, J. F. Goodwin, J. V. T. Gostling, S. Gottlieb, A. J. R. Green, K. Greenwood, J. S. Grewal, D. J. Hadfield, R. G. H. Hall, A. H. Hamed, S. F. Hans, D. M. Hare, A. J. M. Hargreaves, J. R. Harries, W. A. Harries, R. M. Harrison, W. H. Helm, Frieda R. Hendeles, J. C. Hesketh, S. R. Hewitt, A. C. Hicks, T. S. Hindle, F. Hoffstein, Betty Holden, E. Holden, P. Holliday, S. C. H. Hood, P. H. S. Hooper, H. Horbacz, A. L. Horetzky, H. J. Houghton, Geraldine M. Howard, S. H. F. Howard, D. A. Howell, T. E. Hughes, R. B. Illing, K. P. Isserlis, P. S. Jaikaran, W. James, R. T. Jenkins, W. R. John, P. F. Johnson, H. R. Jolly, O. M. Jonathan, A. E. Jones, D. V. M. Jones, W. B. E. Jones, D. Keidan, T. D. Kellock, R. W. Kind, L. G. Kingdom, T. G. Kletz, M. A. Kumar, P. Lambah, V. H. Lees, M. E. Lemerle, S. G. F. Linton, Florence H. Lomax, R. M. Lucas, G. R. W. N. Luntz, J. C. Macaulay, E. L. McDonald, D. McGregor, R. B. McGrigor, Elspeth M. McKechnie, D. McKinlay, V. J. McLean, J. K. McMyn, K. A. McNeill, H. G. McQuade, B. C. Main, S. Mandel, N. M. Mann, C. W. S. F. Manning, C. W. Marsden, D. R. I. Mason, H. F. Melhuish, N. L. Mills, A. Milton, D. L. Mollin, H. Molotnikoff, G. Morgan, J. M. Morgan, A. I. Morrison, P. C. Moxon, J. R. P. Morley, P. B. Newcomb, J. Newcombe, G. McK. J. Nicholl, B. Nicholson, Helen M. Noble, C. C. Packman, F. E. Peall, A. N. Pearce, W. H. Petty, A. B. Philipp, M. P. Pick, R. Pilsworth, Ruby Posner, B. Pownall, J. R. K. Preedy, A. I. D. Prentice, E. J. T. Prettejohn, E. Pringle, N. A. Punt, P. M. Ransford, J. B. Raper, J. P. Raw, A. M. Read, N. P. Read, R. G. Rees, H. Rees, R. K. Reid, S. C. Rexford-Welch, A. L. Ribeiro, A. G. Richards, J. D. Riley, B. H. D. Robinson, R. A. Robinson, S. C. Rogers, A. J. Rook, L. A. Rook, Ruth Roseveare, M. H. Ryder, Olga B. Ryland, L. Sagorin, Olga M. Sainsbury, J. S. Salem, J. W. P. Salt, S. C. Sandifer, R. H. Sandiford, H. C. L. Scott, O. L. S. Scott, J. Shackey, E. G. F. Shaw, Patricia R. Shaw, A. Sherwood, D. S. Short, G. R. M. Sichel, Jean V. Simpson, S. Singh, J. J. Slowe, Audrey V. Smith, P. A. Smith, W. S. C. Snape, Angele M. P. Snow, P. J. Spencer-Phillips, J. W. Squire, J. S. Staffurth, D. A. Stanley, J. H. Steeds, J. P. Stephens, Lilian E. Sullivan, G. E. Sutcliffe, Gwendolyn M. Sutton, G. F. Swann, P. G. Swann, H. F. B. Symons, J. W. Taylor, W. V. Taylor, A. R. Thatcher, H. E. Thomas, J. B. T. Thomas, W. R. G. Thomas, D. G. Thompson, I. F. Thomson, D. J. Tibbs, R. N. Ticehurst, A. M. B. Tompkin, P. A. Trafford, E. J. Tucker, D. R. Urquhart, J. Ward, R. L. Ward, C. R. M. Warner, Edith M. Waterhouse, B. P. Webber, M. E. Weber, J. R. K. Wedd, M. W. West, G. H. Wells-Cole, W. H. Whelan, Beryl D. White, Pamela M. Wilcox, W. V. C. Wiley, I. A. Williams, P. R. E. Williams, J. M. Wilson, H. P. Wingate, J. M. Winn, G. Winocour, R. Winston, J. F. R. Withycombe, C. R. Wood, L. P. J. Wright.

Diplomas in Public Health were granted, jointly with the Royal College of Surgeons, to Gwendolen M. Allen-Williams, Nora E. R. Archer, Hilda M. Robertshaw, F. S. D. Thompson, H. G. Topping. Diplomas in Child Health were granted, jointly with the Royal College of Surgeons, to the 9 candidates whose names were printed in the report published on Oct. 24 (p. 499).

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

At the annual meeting of the Faculty the following officers were elected for the ensuing year: *President*, Mr. James H. MacDonald; *Visitor*, Mr. William A. Sewell; *Honorary Treasurer*, Mr. William J. Richard; *Honorary Librarian*, Dr. W. R. Snodgrass; *Representative on General Medical Council*, Mr. Andrew Allison.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

A quarterly meeting of the Council was held on Oct. 24, with the President, Sir William Fletcher Shaw, in the chair.

The following were admitted: *To the Fellowship*: W. J. H. M. Beattie, C. M. Gwillim. *To the Membership*: Muriel Boycott, J. W. D. Buttery, Marie H. Calverley, I. MacG. Jackson, Mary K. Lawlor, W. J. McCord, Eleanor M. Mills, Mary R. Thompson, H. M. Wolff. *In absentia*, H. Agar, T. A. Gillie, J. F. B. Wyper.

The following have satisfied the examiners and have been awarded the Diploma of the College: I. C. Barne, Margaret R. Biggs, Ruth C. M. Brown, Gertrude M. Child, Edith M. Druitt, Margaret D. Dudley-Brown, Anne C. Fletcher, F. G. M. Fraser, Mairidh A. M. N. Graham, Margaret A. Hay, J. Hesketh, Eluned M. Lloyd-Davies, R. A. Manclark, G. H. Moore, J. E. E. Morgan, H. A. Ripman, E. Sharp, Daisy M. Smith, Ruth M. Stubbs.

The Services

The King has approved the award of the R.N.V.R. Officers' Decoration to Surg. Cmdrs. A. W. Kendall, R. R. B. Roberts, and H. Winstanley, R.N.V.R.

CASUALTIES IN THE MEDICAL SERVICES

War Subs. Capt. SAMUEL HENRY SEGERMAN, R.A.M.C., who is included as "killed" in an Army Council Casualty List published on Oct. 31, was born on March 3, 1914, and was educated at the University of Leeds, where he graduated M.B., Ch.B. in 1938. He also took the D.T.M. of Liverpool in the same year. Before entering the R.A.M.C. as temp. lieut. in Dec., 1940, he was in practice at Middlesbrough and Leeds. He saw service in the Middle East.

Wounded.—Capt. G. M. Calder, R.A.M.C.

Prisoners of War.—War Subs. Capt. H. Bloom, R.A.M.C., War Subs. Capt. W. E. G. Bradford, R.A.M.C., Lieut.-Col. W. B. F. Brennan, R.A.M.C., Capt. L. B. Gunn, R.A.M.C., Capt. P. L. Headon, R.A.M.C., Capt. L. V. Macdonald, R.A.M.C., Prob. Temp. Surg. Lieut. J. C. de R. Sugars, R.N.V.R., Surg. Cmdr. V. F. Walsh, R.N.

Missing, Believed Prisoner of War.—Major T. F. O'Donnell, I.M.S.

Missing, Probably Prisoner of War.—Major K. F. Alford, I.M.S.

Missing.—Capt. R. W. Lennon, R.A.M.C.

DEATHS IN THE SERVICES

Surg. Rear-Admiral ALEXANDER JOHN JAMES JOHNSTON, R.N. (ret.), died at Crapstone, Devon, on Oct. 17, aged 87. He received his professional education at Guy's Hospital and qualified M.R.C.S.Eng. in 1877 and took the L.R.C.P.Ed. in the following year. Entering the Royal Navy soon afterwards he became deputy surg.-general (now surg. rear-admiral) in 1912, and retired after the war of 1914-18. During the latter part of his career he held the posts of deputy surg.-general of the Royal Naval Hospital, Malta, and surg.-general of the Naval Hospital, Chatham, and, later, was a temp. lieut.-col. in the R.A.M.C. He served throughout the war of 1914-18, receiving the medals. He joined the B.M.A. in 1899, and when the Association met at Leicester in 1905 he was vice-president of the Navy, Army, and Ambulance Section.

Lieut.-Col. CHARLES HARDWICK LOUW MEYER, I.M.S. (ret.), died at Exeter on Aug. 30, aged 82. He was born at Grahamstown, South Africa, on Nov. 19, 1859, the son of Capt. Nicholas Meyer, an officer of the old Prussian Army, before the German Empire came into being, who came to England, was naturalized, and entered the British service. Lieut.-Col. Meyer was educated at Grahamstown, Queenstown, and Bloemfontein, and at Guy's Hospital, qualifying M.R.C.S. in 1883. In the same year he graduated M.B. (with honours in forensic medicine), B.S. (with first-class honours) of the University of London, proceeding M.D. in 1885. After filling the posts of house-surgeon and obstetric resident at Guy's he entered the I.M.S. as surgeon in 1887, gaining first place in competitive examination in Feb. and first place in examination at the Army Medical School, Netley, in July, and winning the Herbert Prize and the Ranald Martin Memorial gold medal. He became lieut.-col. after twenty years' service and retired in 1913. Most of his service in India was spent in Bombay, where in 1889 he was appointed professor of physiology, histology, and hygiene in the Grant Medical College (later becoming principal), and physician and registrar of the Sir J. J. Hospital, and professor of pathology in 1902, holding these posts until his retirement. He rejoined for service in the war of 1914–18, when he was second-in-command of the Lady Hardinge Hospital for Indian Troops at Brockenhurst in 1914–16, consulting physician to the Waziristan Field Force in 1917 and to the war hospitals of the Southern Army in India in 1917–19, and was mentioned in dispatches in 1918. After retirement he was consulting physician to the Osborne Convalescent Home and a member of the India Office Medical Board in 1921. He had been a member of the B.M.A. for 50 years and served on the Central Council in 1913–14.

Medical News

The Annual Meeting of Fellows and Members of the Royal College of Surgeons of England will be held at the College in Lincoln's Inn Fields, on Thursday, Nov. 19, at 2.30 p.m., when the President hopes there will be a good attendance.

Prof. J. C. Drummond, D.Sc., scientific adviser to the Ministry of Food, will deliver a series of lectures on "The History of Our More Important Foods" at the Royal Institution, 21, Albemarle Street, W., on Tuesdays, Nov. 24, and Dec. 1, 8, and 15, at 3 p.m.

The Benjamin Ward Richardson Lecture will be delivered at the Royal Sanitary Institute, 90, Buckingham Palace Road, S.W., on Wednesday, Nov. 25, at 2.30 p.m., by Lieut.-Col. D. J. Anthony, M.R.C.V.S., on "The State of Meat Inspection in Britain at War."

A general meeting of the Tuberculosis Association will be held at 26, Portland Place, W., on Friday, Nov. 20, at 2.45 p.m., when there will be a discussion on "The Treatment of Tuberculous Pyothorax," to be opened by Dr. J. Clifford Hoyle, Dr. W. C. Fowler, and Mr. R. C. Brock.

Under the auspices of the British Council a reception was held in Liverpool on Nov. 6 by the Vice-Chancellor of the University and Sir Robert Kelly, F.R.C.S., at which members of the local medical profession and medical representatives of the Allied Nations heard an address by Prof. Henry Cohen, M.D., on "The Principles of Diagnosis: A Retrospect and a Prospect."

At the inaugural luncheon at the Mansion House Mr. Herbert Morrison, Home Secretary, described as a wise and rational step the amalgamation of the Queen's Hospital for Children and the Princess Elizabeth of York Hospital for Children, which will function in future as the Queen Elizabeth Hospital for Children. He said it was true that a substantial portion of the London voluntary hospitals were large and efficient, but a number of them were small and uneconomical and their efficiency open to question. He hoped that King Edward's Hospital Fund for London would help to bring about further amalgamations, and advised greater co-operation in the purchase of supplies. He thought it was a good thing that there should be a certain degree of competition and rivalry in enterprise between municipal and voluntary hospitals.

The Joint Committee for Soviet Aid is launching a nation-wide appeal for medical aid for the soldiers of the Red Army. Every kind of medical supply, equipment, and comfort is urgently required in ever-increasing quantities by the Red Army and the Soviet people in the fighting zones. Donations may be sent to Sir Peter Chalmers Mitchell, F.R.S., Hon. Treasurer, Joint Committee for Soviet Aid, 171, St. Stephen's House, Westminster, S.W.1.

The Ministry of Health, with the co-operation of the Ministry of Information, is launching another winter health campaign to renew the attack on the careless cough and sneeze by means of persistent education on the dangers of droplet infection. Publicity media will be posters, exhibitions, films, and broadcasts.

On Nov. 3 the Minister of Health performed the opening ceremony of the 600-bed Merriston Hospital, near Swansea, which has been built at a cost of £180,000 under the Emergency Hospital Scheme. Until heavier emergency demands arise, five wards, with 200 beds, are being placed at the disposal of the Welsh National Memorial Association for cases of tuberculosis, and the hospital will also be used to relieve the pressure on the Swansea and General Eye Hospital.

At the time of the British occupation of Eritrea the Eritrean section of the Italian Society of Medicine and Tropical Medicine had ceased to function. In order to restore to normality the medical services, and in the interests of co-operation between Italian and British medical men, it was thought to be essential that this society should reopen its meetings and activities. We have received from Lieut.-Col. R. H. Bland, R.A.M.C., principal medical officer for Eritrea, the first two numbers of the *Bolettino* published at Asmara under the editorial direction of Prof. Giovanni Ferro-Luzzi. It is a substantial magazine, each number containing well over 100 pages printed in Italian.

Olive oil is supplied only against a doctor's prescription, but even so there is no guarantee that it will always be available, and the Ministry of Food announces that arachis oil may be substituted provided the prescriber's consent is first obtained. Arachis oil has already been used as substitute in many *B.P.* and *B.P.C.* preparations.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* during the week there was a general rise in the incidence of infectious diseases. The largest increases were those of measles 1,007 cases, whooping-cough 77, and acute pneumonia 51. Scarlet fever, with 84 fewer cases than last week, was the only disease for which a fall in incidence was recorded.

Within the counties no very striking fluctuations occurred in the trend of scarlet fever, diphtheria, and whooping-cough. The largest variation was that of Yorks West Riding, where the numbers of cases of scarlet fever and whooping-cough were 61 and 43 respectively below the totals of the preceding week.

There was a rise of 12 cases in the incidence of dysentery: 30 cases were reported in London, the largest total since February; 10 occurred in Woolwich: and the remaining 20 were distributed over twelve boroughs. Other large county totals were Yorks North Riding 31 (Middlesbrough C.B. 29); Yorks West Riding 29 (Leeds C.B. 15, Sheffield C.B. 8); Derbyshire 12 (Derby C.B. 7, Shardlow R.D. 5); Southampton 10 (Droxford R.D. 7); Wales 24 (Cardiff C.B. 9).

In *Scotland* there was a further rise in the incidence of diphtheria and measles of 39 and 26 cases respectively. Of the 257 notifications of diphtheria, 93 were reported from Glasgow; and of the 379 cases of measles, 120 were notified in Paisley burgh.

In *Eire* the incidence of acute poliomyelitis remains at a high level. The 28 cases were distributed through ten areas. The most important centres of infection were the rural district of Co. Roscommon 8 cases, and Co. Clare, Ennis U.D. 5 cases. One case of typhus was reported from the rural district of Co. Galway.

Small-pox

Six further cases of small-pox have occurred in Edinburgh, bringing the total up to 8; all are in males, and all, as well as the suspected cases, are connected with the original outbreak. The medical officer of health in a statement to an emergency meeting of the Public Health Committee said that the cause of the outbreak was at present unknown. No evidence had been found that could link these cases with the outbreak in either Fife or Glasgow. It was possible that a visitor to the institution had been responsible for introducing the infection.

Small-pox in Fife County

The following letter has been received:

"SIR,—I refer to the statement in the *Journal* of Nov. 7 (p. 565) regarding the Fife County small-pox outbreak. The statement, which appears to be founded on Press reports, is liable to give rise to misunderstanding. No contacts were allowed to return to work. They were not only isolated and kept under medical supervision but received the unusual advantage of being paid allowances. The reference to a colliery strike was an exaggeration. A girl who was not a contact was seen at a pit-head bath to have a rash on her back. Her companions became agitated, but were quickly reassured by an officer of the Public Health Department, and the incident closed.

"The outbreak was completely under control from Oct. 6, when the Public Health Department made the diagnosis, and all restrictions were removed on Nov. 3. In all, there were 27 patients with small-pox, 7 of whom died.—I am, etc., G. MATTHEW FYFE."

Measles

The incidence of measles has increased for six consecutive weeks and is now a little more than two and a half times the level at the beginning of this period. The largest increases in the week under review were those of Lancashire 226, Yorks West Riding 153, Leicestershire 106, Derbyshire 104. The rate of increase has been much greater in the North than in the South during recent weeks. The change in the geographical distribution of measles that has resulted can be illustrated by comparing the percentage distribution with that of the week ending July 25, when the total notifications were approximately the same.

Division	Week ended July 25: 6,817 Notifications	Week ended Oct. 24: 6,803 Notifications
London	10·2	5·3
South-Eastern	14·7	4·2
South-Western	0·9	0·8
South Midlands	8·8	4·4
Eastern	7·3	3·7
West Midlands	6·1	6·6
North Midlands	6·3	10·4
North-Western	23·3	24·4
Yorkshire	10·3	28·2
Northern	9·1	8·3
Wales	2·9	3·7

Returns for the Week Ending October 31

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 2,583, whooping-cough 1,015, diphtheria 898, measles 6,812, acute pneumonia 583, cerebrospinal fever 57, acute poliomyelitis 27, dysentery 290, paratyphoid 7, typhoid 12.

No. 42

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Oct. 24.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942 (a)	(b)	(c)	(d)	(e)	1941 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	66	5	21	—	6	107	7	32	2	8
Deaths		—	—				—	1		
Diphtheria	971	53	257	76	20	1,002	48	309	23	35
Deaths	21	—	4	1	—	11	1	6	1	2
Dysentery	177	30	59	—	—	143	12	93	—	—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	2	—	—		—	4	1	1		—
Deaths		1	—				—	—		
Erysipelas		—	58	9	2		—	40	2	2
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years				59						
Deaths	48	2	15	13		46	—	24	25	8
Measles	6,803	360	379	40	30	783	59	16	57	3
Deaths	7	—	1	—	—	1	—	—	—	—
Ophthalmia neonatorum	68	3	13	2	1	86	3	22	1	1
Deaths										
Paratyphoid fever	7	1	3	—		62	4	7	1	
Deaths	—	—			—	—	—			
Pneumonia, influenzal*	659	39	6	—	2	624	18	4	1	3
Deaths (from influenza)	18	1	1	—	—	12	24	1	—	2
Pneumonia, primary			164	19				159	3	
Deaths		—		7	8		—		7	—
Polio-encephalitis, acute	2	—				2	—			
Deaths		—					1			
Poliomyelitis, acute	25	1	—	28	—	50	1	2	1	1
Deaths		—	—				—	—		
Puerperal fever	—	6	10	3	—	4	4	13	1	—
Deaths		—					—			
Puerperal pyrexia	162	8	10		1	157	10	14		4
Deaths										
Relapsing fever	—	—			—	—	—			
Deaths										
Scarlet fever	2,619	169	430	59	50	1,195	43	233	52	32
Deaths	1	—	—	—	—	2	—	—	—	—
Small-pox	—	—	7		—	—	—	—		—
Deaths		—	—	—	—		—	—	—	—
Typhoid fever†	12	2	6	8	2	16	2	2	7	—
Deaths	—	—	—	1	—	1	1	—		
Typhus fever	—	—	—	1	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	984	64	21	36	6	1,979	222	63	21	7
Deaths	6	—	—	3	—	10	4	4	1	—
Deaths (0–1 year)	314	27	67	25	27	307	27	74	41	18
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	3,818	523	550	182	114	3,677	502	548	149	104
Annual death rate (per 1,000 persons living)			12·4	12·2	‡			11·9	9·9	‡
Live births	5,847	715	899	380	260	5,240	474	814	255	210
Annual rate per 1,000 persons living			18·6	25·4	‡			16·6	16·9	‡
Stillbirths	188	17	39			180	18	37		
Rate per 1,000 total births (including stillborn)			42					43		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A or B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Secretary of the Journal Board, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager (hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and subscriptions should be sent to the Secretary.

TELEPHONE NO.—B.M.A. and *B.M.J.*: EUSTON 2111.

TELEGRAPHIC ADDRESSES.—EDITOR, *Aitiology Westcent, London*; SECRETARY, *Medisecra Westcent, London*.

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

QUERIES AND ANSWERS

Anaemia in Young Adults—Dietetic?

DR. M. E. LAMPARD writes: In reply to Dr. G. D. Summers (Nov. 7, p. 566) parsley is a very rich source of vitamin C.

Aspirin for Asthma

J. K. D. writes: The notes that have appeared in the *Journal* on the subject of the value of aspirin in asthma prompt me to record my own personal experience. Twenty-two years ago, after I had suffered from asthma off and on for 28 years—i.e., from early boyhood—I made the discovery of aspirin as a preventive in my case. My attacks were almost invariably nocturnal. During a spell of frequent attacks, when 4 a.m. never passed without my being awakened by an attack, I had a headache one evening. At bedtime I took an aspirin tablet, 5 grains, for the headache, and to my surprise I was relieved not only of the headache but for the night of asthma also. A few nights' trial with and without aspirin proved that the relief was no mere coincidence, and that my asthmatic tendency was very much reduced by one aspirin tablet. I therefore continued to take one aspirin tablet every night for some years, and I was very seldom troubled by more than slight symptoms. For the last 15 years, although I am still at times conscious of the tendency, I have regarded myself as practically cured. There may have been other factors partly responsible for my relief. I think there have been—e.g., aborting any threat of an attack by a small dose, about four minims, of adrenaline hypodermically—but I am convinced that my small dose of aspirin has been of the greatest value. I never took more than one tablet. I have known a few patients who got some relief from aspirin, but in none was it so marked as in my own case. Like other doctors, I have had experience of the aspirin-sensitive asthmatic whom aspirin renders violently ill. I have not found it of any value after an asthmatic attack has developed. Though not requiring to do so, I still occasionally take aspirin to prevent the possibility, which may be nothing more than a fear, from the analogy of serum anaphylaxis, of long abstinence causing me to acquire sensitiveness to the drug.

Income Tax

Early Years of New Appointment

H. was appointed as a member of a medical board in 1939. For 1939-40 he received £130 and was assessed on £130; for the two following years the amounts have been respectively: 1940-1, £350 and £350; 1941-2, £200 and £350. Is this correct?

*** 1941-2 is the third year of the appointment, and the basis of assessment is the earnings of the preceding year, but if the earnings fall short of that amount a reduction to the actual basis can be claimed. The assessment of £350 was therefore correctly made, but H. can apply for it to be reduced to the actual figure of £200.

General Expenses of Practice

P. seeks information on the following points:

(1) Professional accommodation. One-half of the total cost of rent, rates, etc., is not now usual. On the other hand, one-quarter hardly seems adequate on the facts stated, especially if the total accommodation includes a garage for a car used professionally. We suggest an offer be made to accept one-third under protest. (2) Cost of maid. When only one maid is in fact kept it may be assumed that she assists in private house-work to some extent, and a claim to deduct her wages is valid only in the proportion her time is spent on the professional side of her total work. That no maid might be kept except for the existence of the professional work is not sufficient to justify a claim to deduct the whole expense; the facts have to be taken as they are, not as they might be. We cannot advise on what weekly sum should be charged for her food; it depends too much on the actual facts of the case. (3) If a medical man does in fact pay his wife reasonable remuneration for her services in assisting in the conduct of the practice (say £1 a week) he can deduct that sum as an expense, and she will not be liable for the tax on it as it is covered by the (£80) allowance for "wife's earned income." But if P. did not do so for 1941, he cannot now claim that he did.

LETTERS, NOTES, ETC.

Hypnosis

DR. A. OWEN-FLOOD (London, N.8) writes: It is evident in Dr. L. H. Eunson's letter (Sept. 19, p. 353) that he has not made a deep study of hypnotism. I think he emphasizes the evils of the state. May I indicate some of its blessings when applied to cure many minor maladies encountered in general practice. Bed-wetting, nail-biting, and other "habits" soon disappear in a few sittings; care, of course, is taken to deal with any physical causes. Hyperemesis gravidarum, insomnia in the puerperium, and sudden arrest of the lactation can be cured by hypnosis. These conditions, often so trying to the patient, the relatives, and the doctor, are mild anxiety states. Hypnosis is a useful weapon in the armoury of the anaesthetist. The dangerous excitement stage of the induction can be prevented by using hypnosis before the induction, and it is especially easy to apply when the premedication is morphine and scopolamine in the usual doses. Spinal anaesthesia is robbed of all its tendency to produce psychic trauma if a trance state is induced as soon as the tingling and numbness are felt in the legs. This seems to render the patient more sensitive to suggestion.

Gastritis in Children and Priority Eggs

DR. PAUL R. E. KIRBY (Brighton) writes: I am at present attending a child aged 4 who is seriously ill with persistent vomiting and pneumonia. Amongst other forms of treatment albumen water is required. I gave the mother Form EG1/C.1 to take to the local food office, but left the category blank as the condition did not come under A, B, C, or D; I wrote on the back of the form: "Child very seriously ill with vomiting and pneumonia." Eggs were refused for the following reasons: (1) class not filled up; (2) condition did not come under category A, B, C, or D. If this child does not get eggs he may die, and yet an expectant mother in good health and doing a full day's work can get them. It does not make sense. Vomiting in children is one of the commonest conditions encountered in general practice and yet no provision is made for it. May I suggest a fifth category—namely, (E) for children suffering from gastritis and requiring eggs and milk or albumen water.

First-aid Treatment for Fractured Spine

MR. J. R. M. WHIGHAM (St. Andrew's Hospital, E.3) writes: Lieut.-Col. J. L. Moir's letter (Oct. 31, p. 529), in which he suggests a simplified method for the first-aid treatment of fractures of the spine, will be appreciated by all those concerned in this branch of work. Another point on which the guidance of orthopaedic surgeons would be valuable, and one which gives rise to confusion in the minds of students of first aid, is the desirability or otherwise of reducing open (compound) fractures of the limbs before applying splints.

MEDICINE 100 YEARS AGO

The following are answers to correspondents, printed at the end of the *Provincial Medical Journal* for November 12, 1842:

Dr. Hennen's communication, on the Mortality of the Children at the Royal Military Asylum, &c., shall appear in our next number. We have also to acknowledge the receipt of an interesting case of hydatids of the brain, by *Mr. Tanner*.

B.—We are not yet reduced to the necessity of inserting communications from quacks, whether professional or non-professional. The gentlemen who inhabit certain "squares" must, therefore, content themselves with the publicity which results from the insertion of their puffs in the "Lancet" and "Medical Gazette." It is really deplorable to see how unwilling men are to practice what they preach.

The requests of *Mr. Walker* and *Philo* have been attended to.

We have received some letters relative to the transmission of the Journal, which have been submitted to the publisher.

Amicus.—We thank *Amicus* for his kindness, and shall be glad to receive the first part for perusal.

A.F.—We refer *A.F.* to our advertising columns. The manual of M. Cazenave is the best *elementary* work that the practitioner can possess. There are more elaborate treatises on diseases of the skin, but the one we allude to is the most practical and convenient one with which we are acquainted.

Z.—Our correspondent's prophecy has been fulfilled; but the poor attempt to revive the *Bat's Club* can at the present day only excite contempt. The time is gone by since a falling journal could be propped up by calumny and impotent sarcasm.